Railway Engineering and Maintenance

75%



MACK

Reversible Switch Point Protectors are in use on 75% of the leading railroads.

Manufactured by
THE FLEMING COMPANY
Scranton, Penn.

Foreign Sales Agents
The P.&M. Co., Ltd.
London, England

Exclusive Sales Agents for the United States

THE MAINTENANCE EQUIPMENT COMPANY

New York
Cleveland
Chicago
San Francisco
St. Louis
Denver



Prevention
is cheaper than the cure

NO track disease spreads as fast or costs as much to cure as "loose rail joints". Unless treated immediately, complications will develop which shorten the life of rails, ties, bolts and angle bars.

Application of HY-CROME with the laying of new rails makes a track immune to this contagious malady. Its great reactive power will keep rail joints tight no matter how many times a day they are exposed to the loosening shocks of modern equipment.

The cost of HY-CROME protection is infinitesimal compared to the huge savings in maintenance costs. Its non-fatiguing qualities insure *permanent* rail joint security.

The Reliance Manufacturing Co.
Massillon, Ohio
Address Dept. M. E.

HY-CROME

"THE MOST OF THE BEST FOR THE LEAST"

RAILWAY ENGINEERING AND MAINTENANCE
Published monthly by Simmons-Boardman Publishing Co., at 105 W. Adams St., Chicago. Subscription price: United States, Canada and Mexico, $2.00; foreign countries, $3.00 a year. Single copy, 35 cents. Entered as second class matter January 13, 1916, at the postoffice at Chicago, Illinois, under the Act of March 3, 1879.
Alphabetical Index to Advertisers, Page 64 Classified Index to Advertisers, 60-62

MAKES TIES LAST

Not Only Longer



but longest—

TO get maximum life from creosoted ties, they must not be cut or wounded after treatment. Whenever creosoted ties are cut, the untreated wood becomes exposed and it is at such points that decay will start.

A tie plate therefore that cuts into the timber defeats its own purpose. Conversely, it is the non-cutting feature that makes the Lundie Plate so desirable.

It gives the desired inclination to the rail, holds track to gauge and above all accomplishes this without cutting a single fibre of the tie.

It is the only essentially flat bottom plate that holds track to perfect gauge. The total absence of destructive projections prevents cutting and insures that maximum return on cross tie investment.

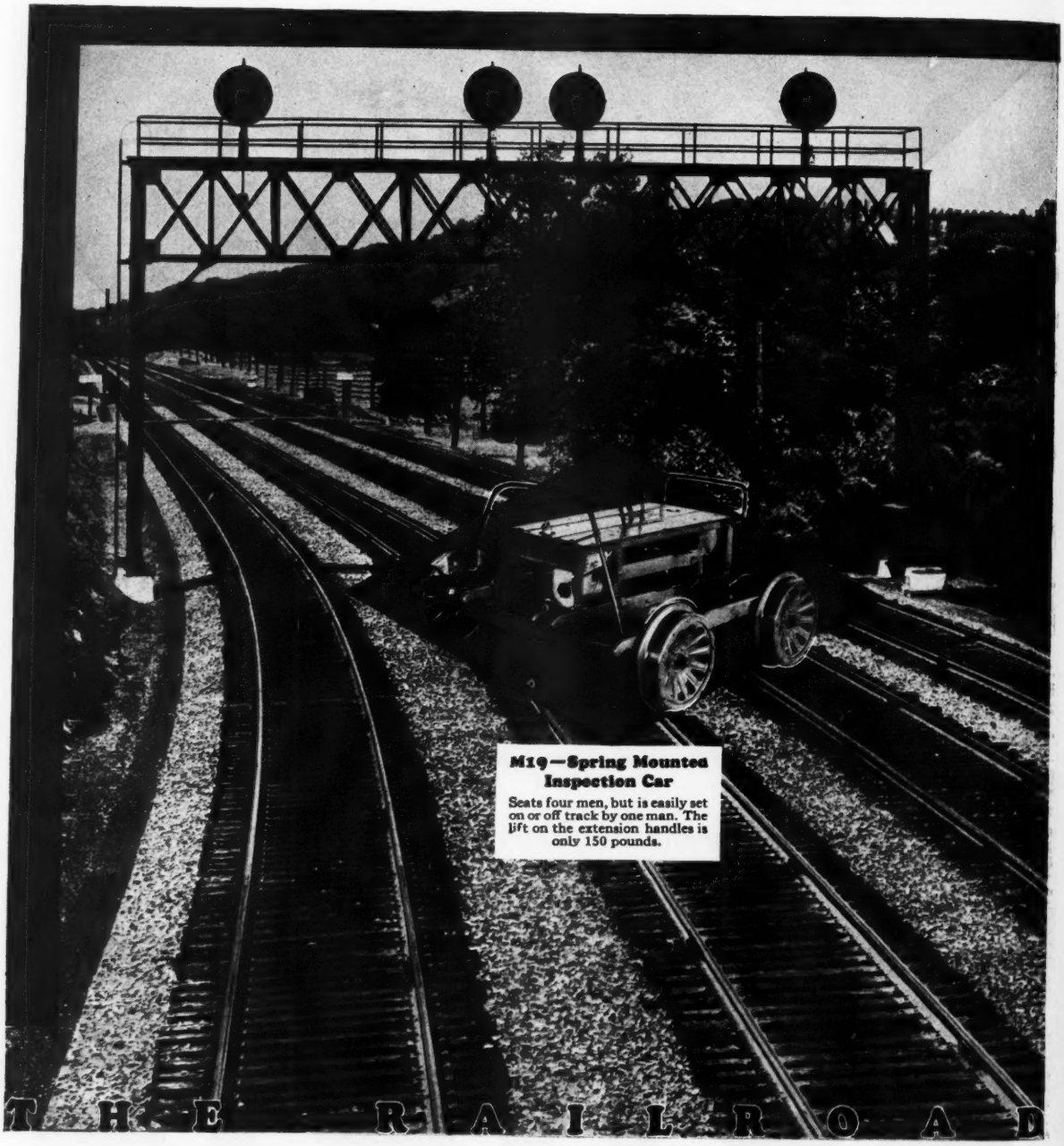
The Lundie Engineering Corporation

285 Madison Avenue, New York

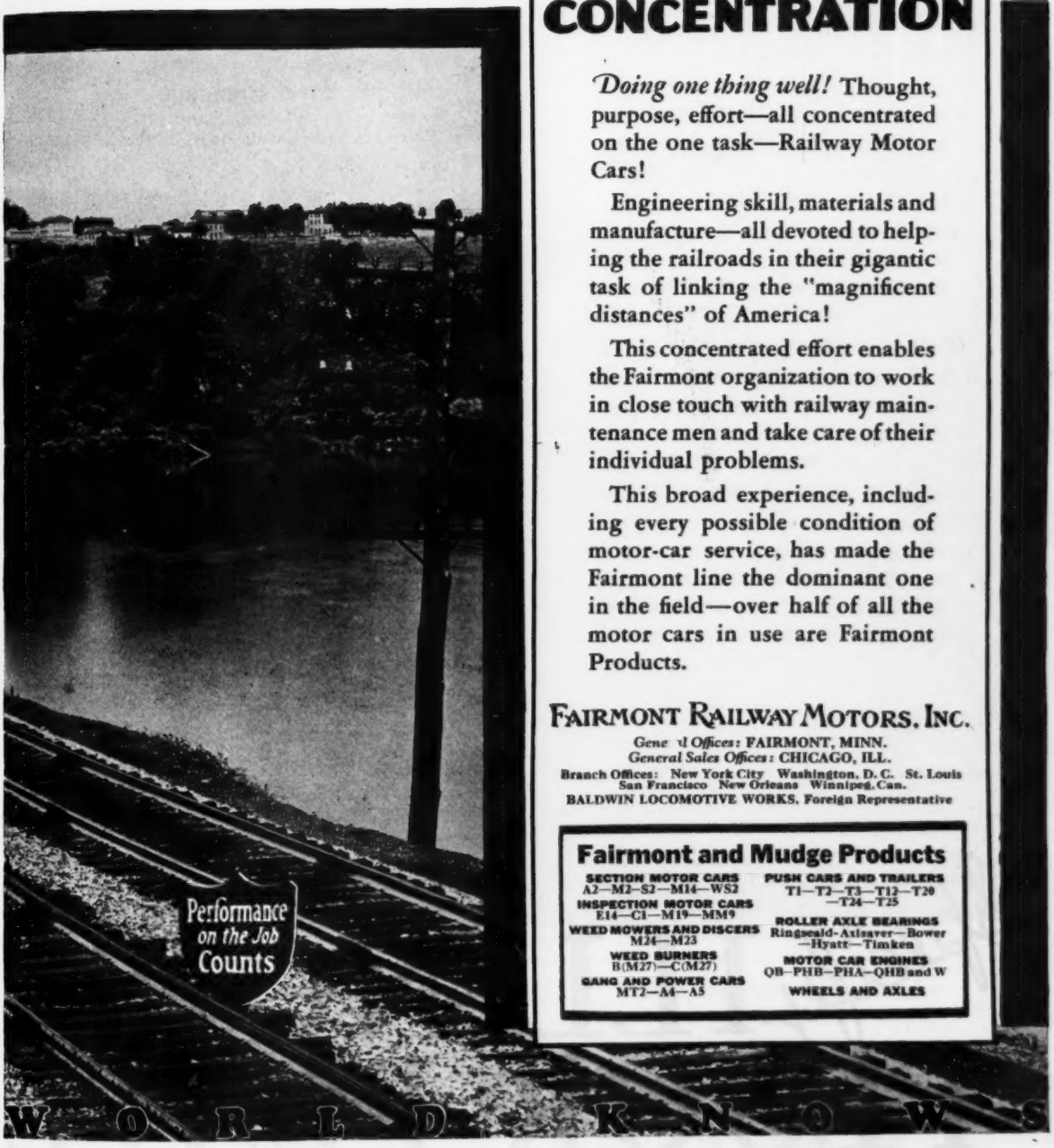
166 West Jackson Boulevard, Chicago

LUNDIE TIE PLATE

Fairmont RAILWAY MOTOR



AND Mudge CARS



CONCENTRATION

Doing one thing well! Thought, purpose, effort—all concentrated on the one task—Railway Motor Cars!

Engineering skill, materials and manufacture—all devoted to helping the railroads in their gigantic task of linking the "magnificent distances" of America!

This concentrated effort enables the Fairmont organization to work in close touch with railway maintenance men and take care of their individual problems.

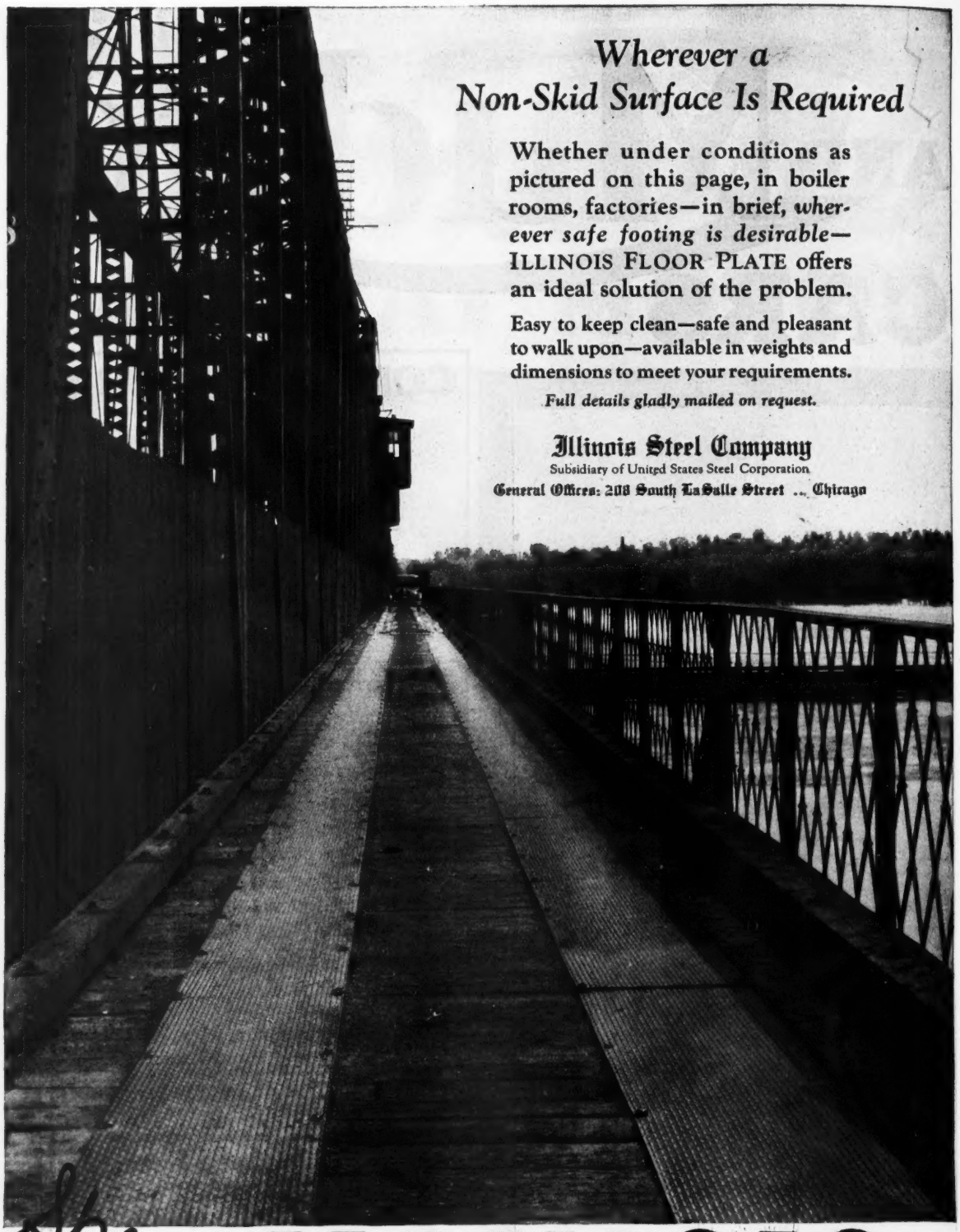
This broad experience, including every possible condition of motor-car service, has made the Fairmont line the dominant one in the field—over half of all the motor cars in use are Fairmont Products.

FAIRMONT RAILWAY MOTORS, INC.

General Offices: FAIRMONT, MINN.
General Sales Offices: CHICAGO, ILL.
Branch Offices: New York City Washington, D. C. St. Louis San Francisco New Orleans Winnipeg, Can.
BALDWIN LOCOMOTIVE WORKS, Foreign Representative

Fairmont and Mudge Products

SECTION MOTOR CARS
A2—M2—S2—M14—WS2
INSPECTION MOTOR CARS
E14—C1—M19—MM9
WEED MOWERS AND DISCERS
M24—M23
WEED BURNERS
B(M27)—C(M27)
GANG AND POWER CARS
MT2—A4—A5
PUSH CARS AND TRAILERS
T1—T2—T3—T12—T20—T24—T25
ROLLER AXLE BEARINGS
Ringsealed-Axlsaver—Bower—Hyatt—Timken
MOTOR CAR ENGINES
QB—PHB—PHA—QHB and W
WHEELS AND AXLES



Wherever a Non-Skid Surface Is Required

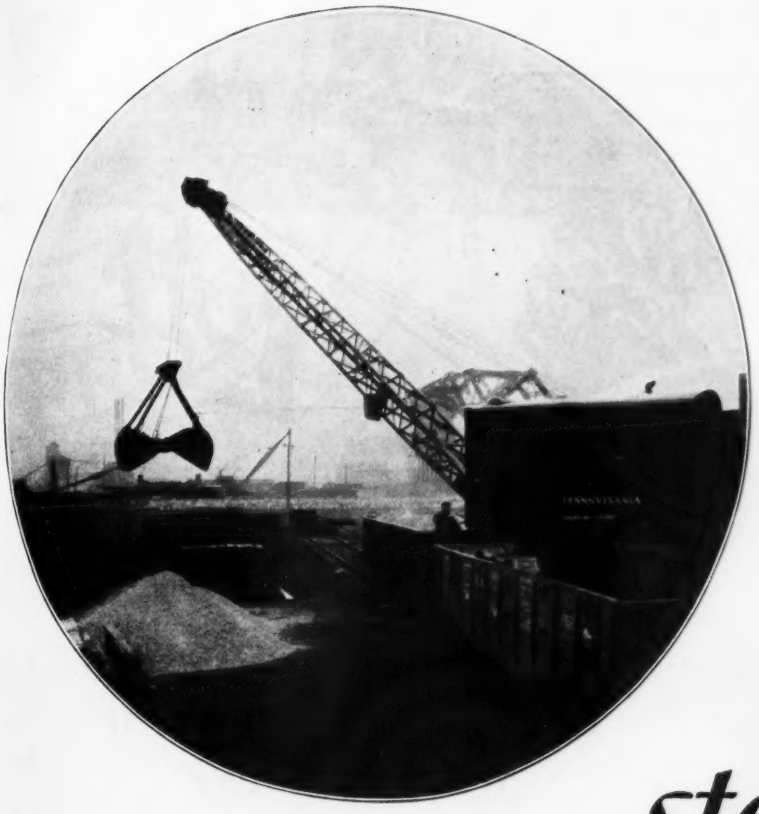
Whether under conditions as pictured on this page, in boiler rooms, factories—in brief, *wherever safe footing is desirable*—ILLINOIS FLOOR PLATE offers an ideal solution of the problem.

Easy to keep clean—safe and pleasant to walk upon—available in weights and dimensions to meet your requirements.

Full details gladly mailed on request.

Illinois Steel Company
Subsidiary of United States Steel Corporation
General Offices: 208 South LaSalle Street ... Chicago

Specify ILLINOIS FLOOR PLATE



The standard of the railroads!

That's the Model 3, a ¾ cu. yd. Northwest. The Model 3 can travel from car to car over gondolas or flat cars working as it goes. There is no need for special steel underframes or extra reinforcing on the cars.

It will handle maximum weight rail with frogs, switches and crossings, and when equipped with a clamshell it loads coal, cinders, ballast, slag—even ties. With a magnet it picks up steel along the right-of-way or handles stock in the yard.

It's the railroaders crane—fourteen railroads are now using them. You will be interested in seeing motion pictures of these machines at work—then let us show you the real thing.



NORTHWEST ENGINEERING CO.

The world's largest exclusive builders of gasoline and electric powered shovels, cranes and draglines

1701 Steger Building - 28 E. Jackson Boulevard.
Chicago, Ill., U. S. A.

NORTHWEST



They shorten the line at the pay car

VERONA Rail Joint Springs do away entirely with the necessity for periodical bolt tightening.

With this task eliminated, track can be maintained with considerably fewer men. Thus your smallest item of equipment — a nut-locking device—cuts down your biggest item of maintenance—labor. You pay for the equipment once; but you pay for the labor daily.

Labor is not the only saving effected by permanently tight joints. They save rail ends and splice bars and ties, and the staggering cost of wrecks, derailments, and delays.

But quite apart from these items, important though they may be, Verona Rail Joint Springs save their cost many times merely through shortening the line at the pay car.

VERONA TOOL WORKS

Pittsburgh, New York, Chicago, St. Louis, San Francisco
New Orleans, Washington, St. Paul, Baltimore

BIG PRODUCERS FOR BIG JOBS



Quickly Convertible into a Dragline

THE soundness of the design of this big machine has been proved thoroughly by the 3000 P & H Gasoline and Diesel Excavators which have been placed in service.

The Model 900 has many features never before incorporated in a machine of this size. It is provided with steering brakes and can be maneuvered around as easily as a machine of ½ yard capacity.

All shafts above the deck, including the swing rollers, are provided with Hyatt or Timken roller bearings. This assures maximum delivery of power to the business end of the machine.

All frames, including the car body, drum side stands and revolving frame are single piece-steel castings. The Diesel engine is mounted directly upon the revolving frame so that it is always in perfect alignment with main machinery. There are many other profit-producing features.

Send for complete information.

HARNISCHFEGER CORPORATION
Established in 1884
3820 National Avenue, Milwaukee, Wis.
Offices and Agents in All Principal Cities

TYPE 900 3-3½ yds.

P&H DIESEL EXCAVATORS

(9848-A)



KALAMAZOOS are requisitioned in 40 Different Tongues

SO world-wide is the demand for the convenient, unfailing, economical service given by Kalamazoo Motor Cars, that Kalamazoos are requisitioned in the tongue of every civilized country using railway motor cars.

Kalamazoo "23" (illustrated below) is used in general section work and in bridge and building inspection work.

It has a seating capacity for 8 to 10 men and ample tool space. Is powerful and sturdy, but so designed that two men can lift it off and on the track. 2 cylinder, 4 cycle motor.

Full information on request.



Motor Car No. 23

"Kalamazoo Means Service to You"

KALAMAZOO RAILWAY SUPPLY COMPANY

MANUFACTURERS—Established 1883

KALAMAZOO, MICHIGAN

BALANCED DESIGN



Why do your hose have tripled toes . . . ?

"92 per cent need this protection" say 20,000 culverts



More than 20,000 culverts have been inspected and in the culverts that showed signs of wear—

The bottom half or less was affected in.....92%.

The culvert was affected beyond one-half in only.....8%.

Paving the lower half therefore would protect 92% of these culverts.

ASK your hosiery salesman—he'll tell you tripled toes lengthen the service of hosiery—it's a case of balanced design—reinforcement where the wear is hardest.

The Armco Paved Invert provides balanced design for culverts. It protects the invert of the culvert against wear (erosion). Bulletin H 33 gives full information—a copy is yours for the asking.

Armco Culverts and Drains are manufactured from the Armco Ingot Iron of The American Rolling Mill Company and always bear its brand

ARMCO CULVERT MANUFACTURERS ASSOCIATION
MIDDLETOWN, OHIO

ARMCO PAVED INVERT CULVERTS



© 1929, A. C. M. A.

Where Track Must be Shifted or Raised







The above illustrations show the Track Machine used for building a fill on a railroad construction job, shifting track in building a yard and on heavy main line ballasting.

The performance of Track Machines in service on railroads, contracting jobs, mines and other applications where track is shifted and raised, demonstrates the advantages of this unusual machine over hand methods. In addition to effecting a big saving in labor expense, it permits of faster operation and will work under conditions where it would be almost impossible to work by hand.

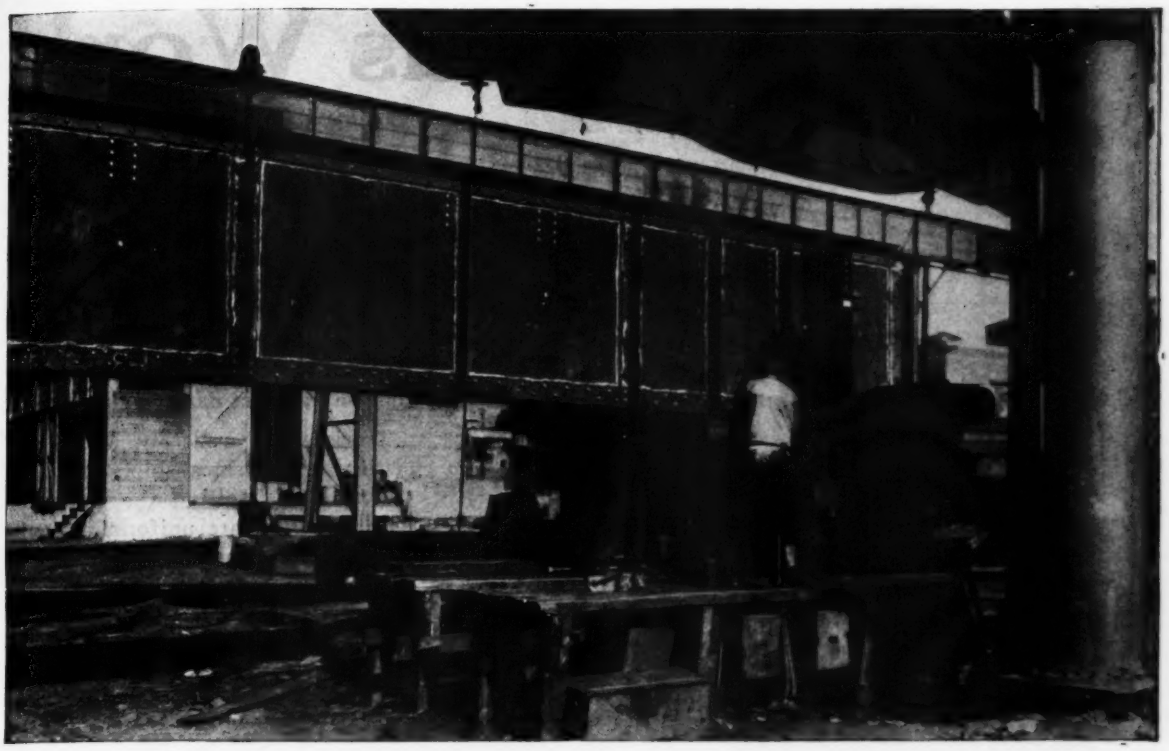
The many satisfied users of the previous model are surprised at the performance of the new Model "S". The design as now offered is at least 25 per cent faster. Its ease in handling appeals to the operator.

Those who have track to raise and shift, whether standard or narrow gauge, will find a great time and labor saver in the Nordberg Track Machine.

Write our Railway Equipment Department for Bulletin YE-8 on how this machine can be used on your jobs. Perhaps there is an installation in your vicinity.

Nordberg Mfg. Co.
Milwaukee, Wis.

THE NORDBERG PATENTED
TRACK MACHINE



Proved PROTECTION *for* Iron *and* Steel



Proved by the rigid tests of experts . . . *proved* by its continued use for more than 100 years—pure red-lead is recognized as the standard protective paint for metal.

On railroads, in the shipyards . . . and on bridges, tanks and steel structures of every type . . . you'll find red-lead paint in excellent condition after exceptionally long periods of service.

That is why paint authorities say: "Three coats of pure red-lead give protection for metal that is unexcelled in length of life."

Fine, uniform, highly oxidized . . . there is no better red-lead obtainable than Dutch Boy red-lead. It comes in two forms . . . paste and liquid. The liquid (ready for the brush) is supplied in six colors — natural orange-red, light and dark brown, light and dark green, and black. The paste comes in natural orange-red and can be shaded to dark colors.

DUTCH BOY SOLDER

Another Dutch Boy product is solder. There is a Dutch Boy solder for every purpose, each bar or ingot carrying a number to indicate its exact composition. Dutch Boy 111, for example, contains 50% tin and 50% lead.



NATIONAL LEAD COMPANY

New York, 111 Broadway • Buffalo, 116 Oak Street Chicago, 900 West 18th Street • Cincinnati, 659 Freeman Ave. • Cleveland, 820 West Superior Ave. • St. Louis, 722 Chestnut St. • San Francisco, 235 Montgomery St. • Boston, National-Boston Lead Co., 800 Albany St. • Pittsburgh, National Lead & Oil Co. of Pa., 316 Fourth Ave. • Philadelphia, John T. Lewis & Bros. Co., Widener Bldg.

DUTCH BOY RED-LEAD

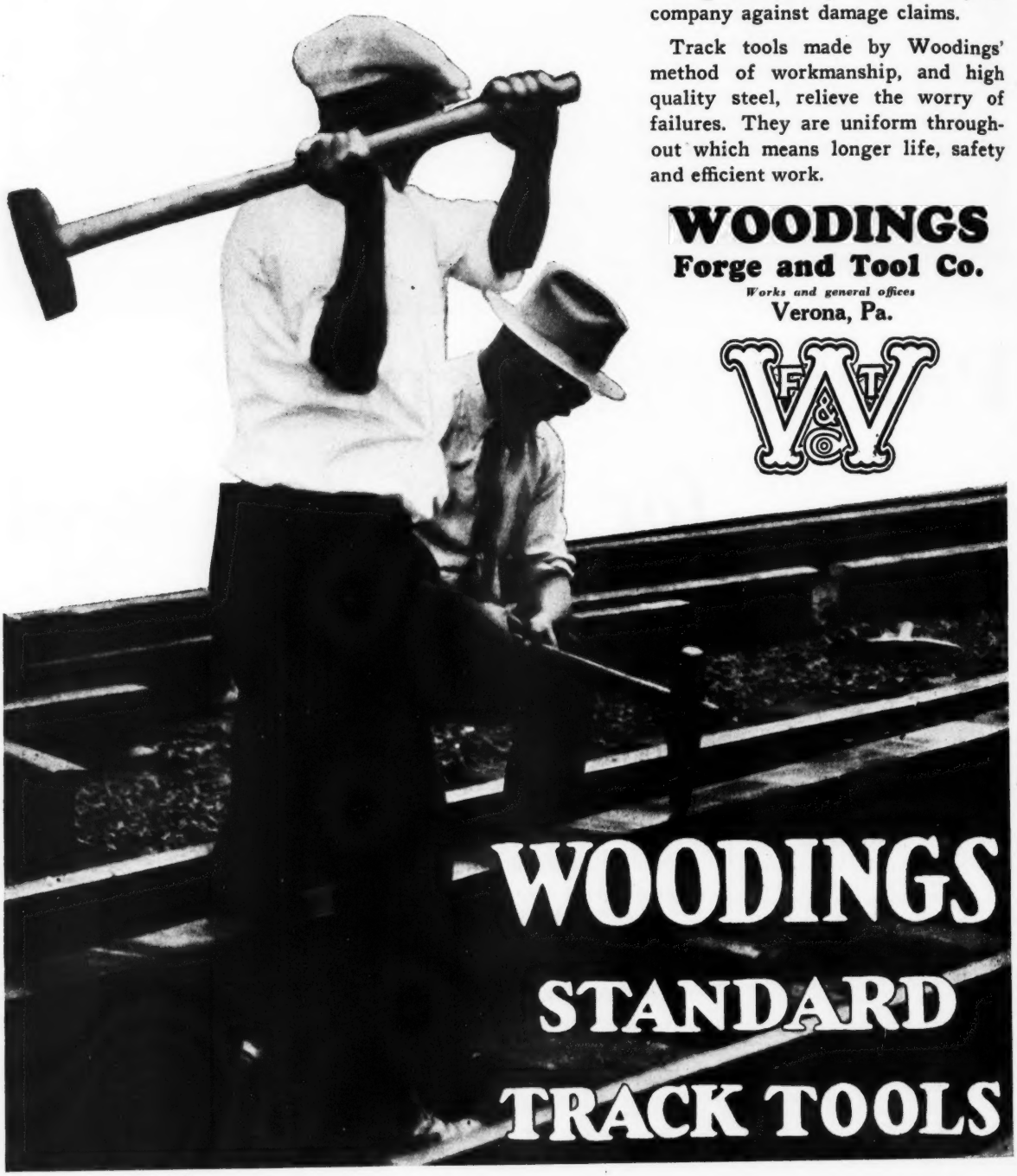
For Dangerous Work

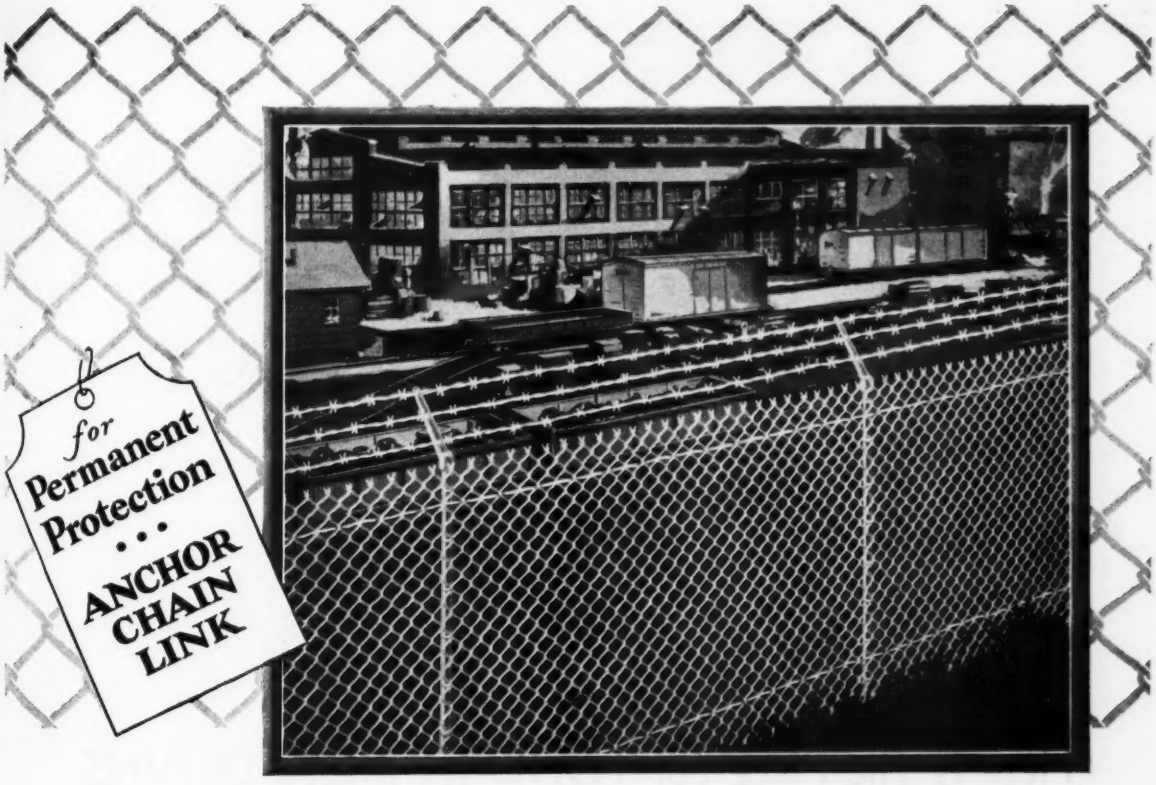
THE risk is too great to take a chance with poor tools and your Foremen and Roadmasters must be prepared to meet every possible emergency.

By specifying track tools made by Woodings Forge & Tool Co. you provide greater safety and insure your company against damage claims.

Track tools made by Woodings' method of workmanship, and high quality steel, relieve the worry of failures. They are uniform throughout which means longer life, safety and efficient work.

WOODINGS
Forge and Tool Co.
Works and general offices
Verona, Pa.





Longer life . . . Less maintenance

. . the result of four exclusive Anchor Fence features

FOR each vital point in a fence an exclusive Anchor feature has been developed to defeat wear, tear and strain. Each of these features has demonstrated its value under severe service—proved that it lengthens fence life and reduces maintenance to a negligible amount.

The careful fence buyer will quickly recognize the advantages that must result from such improvements as: a gate frame of heavy *square* tubular steel, *arc-welded* at corners; *square* tubular steel terminal posts; U-shaped intermediate posts; Drive-anchorage which supports posts firmly in any soil, gripping the soil like the roots of a tree. ***All Anchor Posts are made of high carbon steel***—not mild steel. And the fabric used for Anchor Chain Link Fences is made of copper-bearing steel wire, heavily galvanized *after* weaving.

Have the nearest Anchor office send information about these improvements found in every Anchor Chain Link Fence.

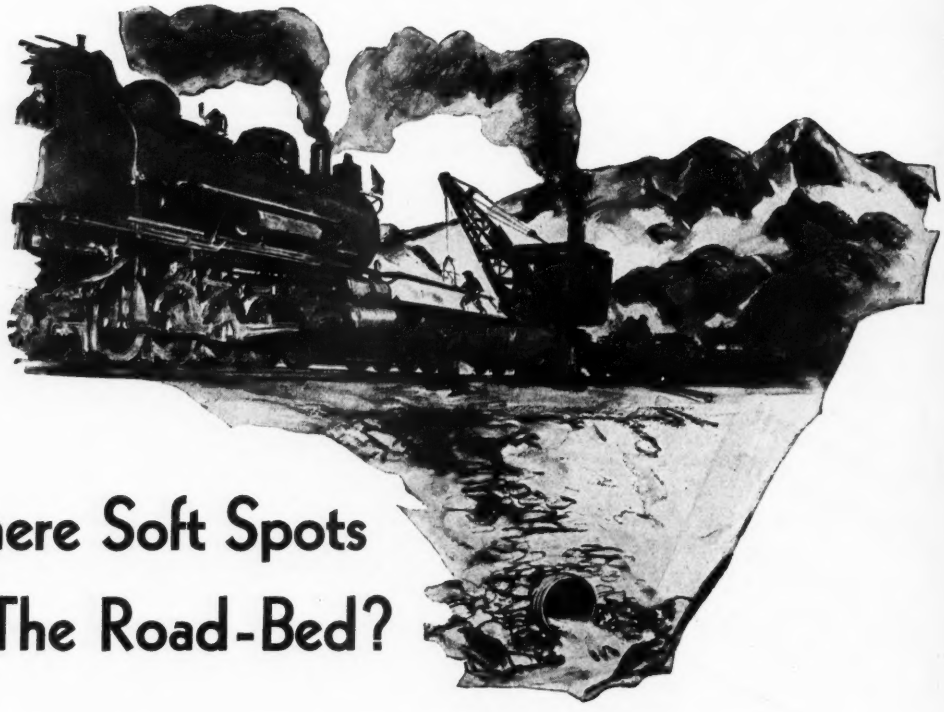
Anchor Post Fence Co., Eastern Ave. & Kane St., Baltimore, Md.

Albany; Boston; Charlotte; Chicago; Cincinnati; Cleveland; Detroit; Hartford; Houston; Los Angeles; Mineola, L. I.; Newark; New York; Philadelphia; Pittsburgh; St. Louis; San Francisco; Shreveport

Representatives in all principal cities. Consult local classified directory.

ANCHOR Fences

MADE BY THE MAKERS OF AMERICA'S FIRST CHAIN LINK FENCE



Are There Soft Spots In The Road-Bed?

Here Is The Place For TONCAN IRON DRAINS

CONSTANTLY increasing speeds and train loads are searching out the soft spots in the road-bed. Heavy loads form depressions under the track that tend to hold water.

To correct these conditions requires adequate sub-drainage facilities. Use drains of Toncan Iron to keep the road-bed firm and dry. Bury them deep if you will; secure in the assurance that Toncan Iron drains are strong and flexible to resist vibration and heavy loads.

Where permanence is needed, as in corrugated culverts, Toncan Iron affords the greatest assurance of long life.

Toncan Iron builds up its well-known resistance to corrosion and erosion by the inclusion of copper and molybdenum. These elements give the naturally resistant iron a still further protection against rusting and corrosion.

For permanence at reasonable cost, install Toncan drains and culverts.



CENTRAL ALLOY STEEL CORPORATION, *Massillon*, OHIO

World's Largest and Most Highly Specialized Alloy Steel Producers

Makers of Agathon Alloy Steels

Cleveland Detroit Chicago New York St. Louis Cincinnati
San Francisco Syracuse Philadelphia Los Angeles Seattle

Export Office: New York Central Building, New York, N. Y.

TONCAN COPPER MO-LYB-DEN-UM **IRON**

Think of what it means in Saving Time Saving Work *and in* Stronger Fences



The NATIONAL Dirt Set *Expanding Anchor* End & Corner Posts

SOMETHING entirely new in end and corner post construction—the National "Dirt Set" Expanding Anchor Angle Steel Posts. With their use—no cement is needed—no water to haul—no waiting for concrete to "set." You can set these end and corner posts and go right ahead with stretching the fence.

Simple—Time Saving—Economical. The Expanding Anchor is an exclusive feature and is one of the greatest improvements offered in years of fence construction. Catalog sent on request.

End Post

Corner Post

ALSO

Woven Wire Right-of-Way Fences—Steel Line Posts—Wire Nails—Spikes—Steel Gates—Electrical Wires and Cables—Wire Rope — Rail Bonds — Springs.

AMERICAN STEEL & WIRE COMPANY

Subsidiary of United States Steel Corporation

208 S. La Salle Street, Chicago 30 Church Street, New York

Other Sales Offices: Boston Cleveland Worcester Philadelphia Pittsburgh Buffalo Detroit Cincinnati Baltimore Wilkes-Barre St. Louis Kansas City Minneapolis-St. Paul Oklahoma City Birmingham Atlanta Memphis Dallas Denver Salt Lake City

U. S. Steel Products Company: San Francisco Los Angeles Portland Seattle Export Distributors: United States Steel Products Co., 30 Church St., New York, N. Y.



Cobble Mountain Tunnel in Massachusetts which is being driven with du Pont Special Gelatin as a part of the water supply system for the city of Springfield

The most practical criterion for the choice of a gelatin dynamite is the *reputation of the manufacturer*

IT is difficult for the consumer to judge the relative merits of different makes of gelatin. Unless he is an explosives chemist, he cannot draw any reliable conclusion from an analysis of the dynamites. Certainly, he cannot distinguish a superior gelatin by its appearance, or its odor, or its feel.

Theoretically, the most logical method of finding out which of two different makes of gelatin is better adapted for a particular purpose would be to conduct a comparative trial extending over a considerable period of time and accompanied by careful cost accounting. And to render such a trial conclusive, it would probably be necessary to test several different strengths of each make of explosive, for a lower strength gelatin of one manufacturer may give better results than a higher strength gelatin of another manufacturer, and thus effect a cheaper blasting cost.

However, exhaustive trials of several different makes of explosives are not always feasible in mines and rarely so in tunnels and other projects where speed of progress is an important factor in cost.

Consequently, the operator must frequently rely on some other basis for the choice of his gelatin. The most important consideration then is the reputation of the manufacturer as such, and the next consideration is the manufacturer's facilities for giving sound advice as to the most efficient and most economical type and grade of explosive for the work in hand and the safest and most effective way of using it.

In reputation as a manufacturer of explosives and in technical service, *the du Pont Company stands first.*

E. I. du Pont de Nemours & Co., Inc.

Explosives Department **Wilmington, Delaware**

DU PONT

REG. U. S. PAT. OFF.

GELATIN DYNAMITE

"Sheffield"

will *never* relax its standards!

It would be easy for "Sheffield" to make motor cars at lower cost—by omitting important refinements to meet a scale of shop charges.

But it would be a difficult task to make motor cars better—for "Sheffield" research, design and construction are restricted by neither expense nor time.

The "Sheffield" policy aims at low *over-all* cost of railway motor cars. This policy was definitely adopted before "Sheffield"—in 1896—built the first gasoline car to appear on American rails. Rigid adherence to this policy has made "Sheffield" the leading manufacturer of railway motor cars and trailers—unassailable evidence that railroad men, too, believe that low *over-all* cost is more important than low purchase price.

First on the rails —and still first

With continued leadership based upon this policy, it is easy to believe that *"Sheffield" will* never *relax its standards.*

FAIRBANKS-MORSE

MOTOR CARS

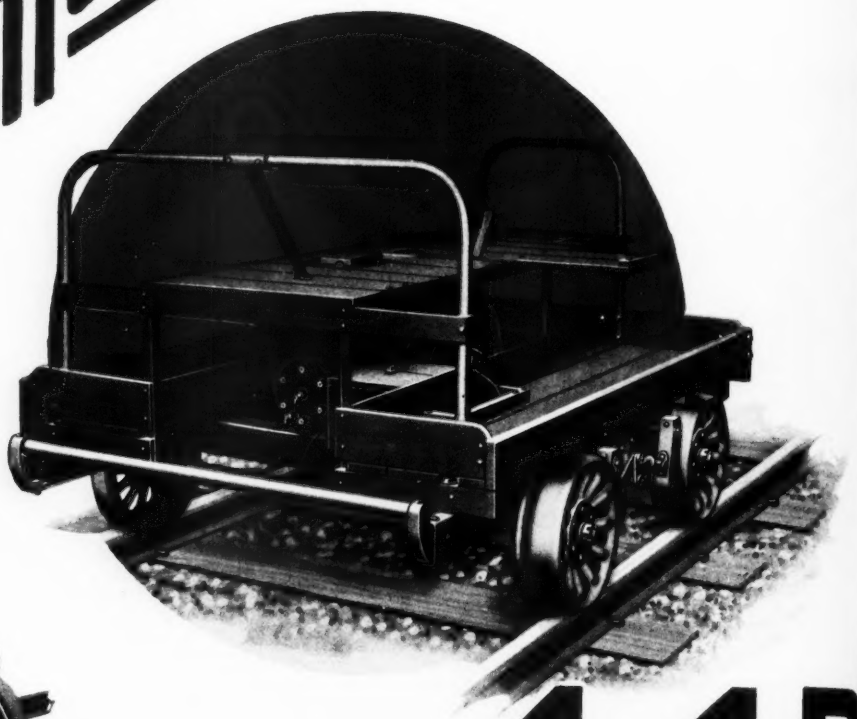
TIMKEN BEARING EQUIPPED

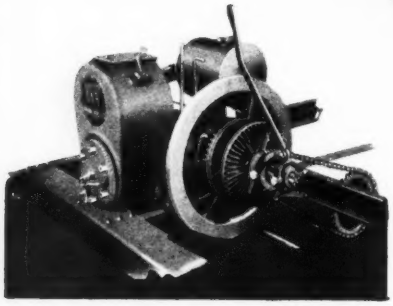
F M

FAIRBANKS-MORSE *Motor Cars*

FAIRBANKS-MORSE MOTOR CARS

"Sheffield"





44B

This one reason alone —

It's a great car—most railroad men know it is the best single-cylinder section car on the rails! Lightness is combined with strength—its huskiness makes no sacrifice to fuel and oil economy. There are many valid reasons for purchasing "Sheffield 44B"s. But one reason stands above them all.

You can put this car on a section with greater assurance that it will stay out of the repair shop and will not have to be "tinkered with" on the road.

The clutch cannot be burned out:

The clutch is built to "slip" when it should slip and rough handling cannot put it out of order.

Just send for a bulletin giving a complete description and specifications.

FAIRBANKS, MORSE & CO., *Chicago*

Manufacturers of railway motor cars; hand cars; push cars; velocipedes; standpipes for water and oil; tank fixtures; stationary and marine oil engines; steam, power and centrifugal pumps; scales; motors and generators; complete coaling stations.

TIMKEN BEARING EQUIPPED

FAIRBANKS-MORSE

MOTOR CARS

First on the rails — and still first

for 127 Years
it held America's finest rum



IT was fine rum that came out of New England in the early days. And the finest of it all—state those ancient Down-Easters who can't recall it without a slight gulp and a tear—came from the distillery founded in 1790 by Messrs. A. and G. J. Caldwell at Newburyport, Massachusetts.

Through five generations of the Caldwell family, nothing but the finest of materials would serve for the distillation and aging of their proud product.

And so the Caldwells selected Tidewater Red Cypress for their storage tanks. This southland lumber was chemically inert and was the most durable lumber that America produced.

Then 1917 brought the ban of Mr. Volstead. The distillery met its first and final defeat. But the Tidewater Red Cypress is still sound as a dollar.

Railroads find Tidewater Red Cypress especially suitable for passenger station construction, freight sheds, warehouses, ties, platforms, signal conduits, water tanks, box cars, fencing, and, in short, any use where long life and freedom from repairs are essential.

Technical data will be supplied gladly by the Southern Cypress Manufacturers' Association, Jacksonville, Florida.

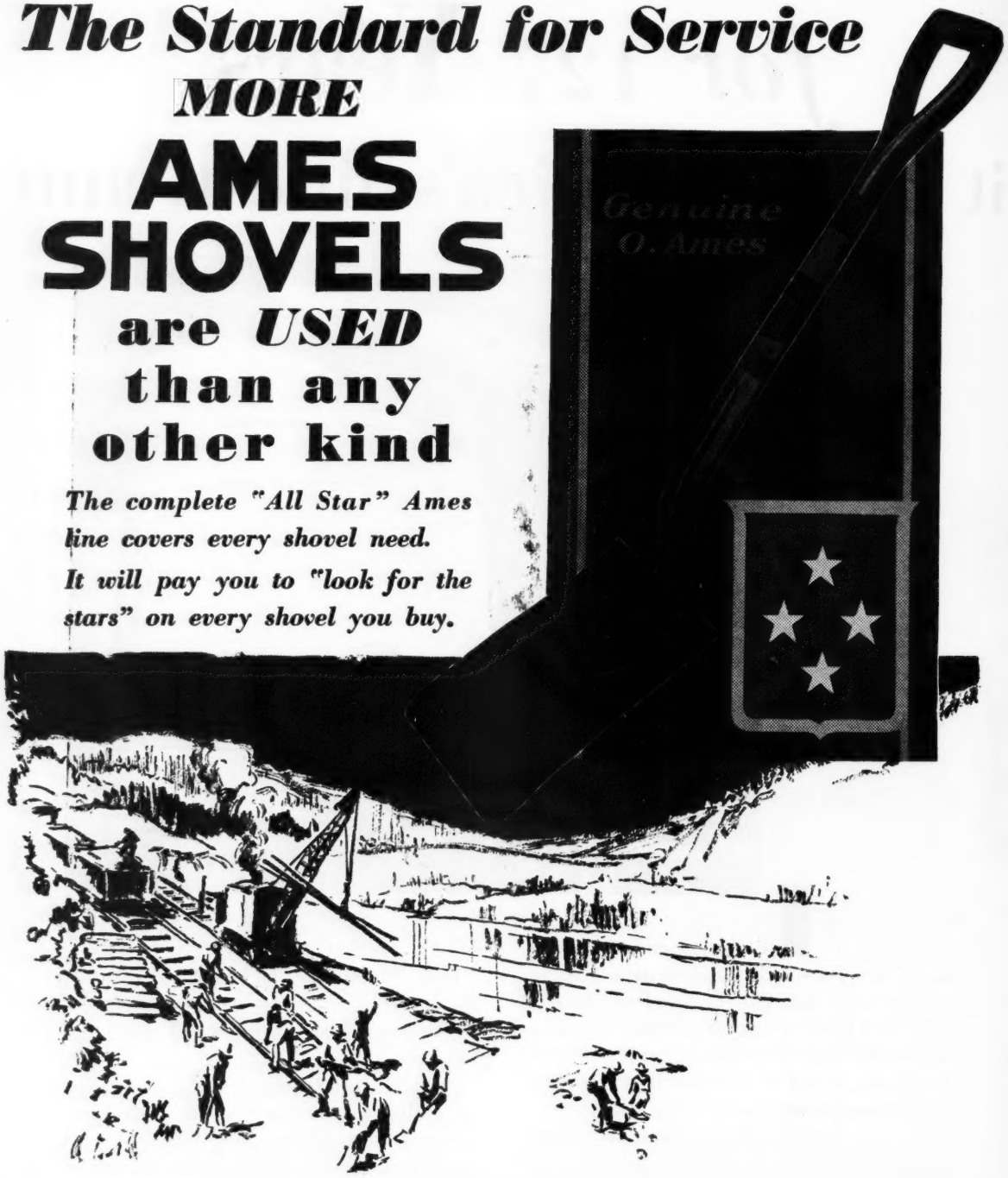
Specify **TIDEWATER RED CYPRESS**

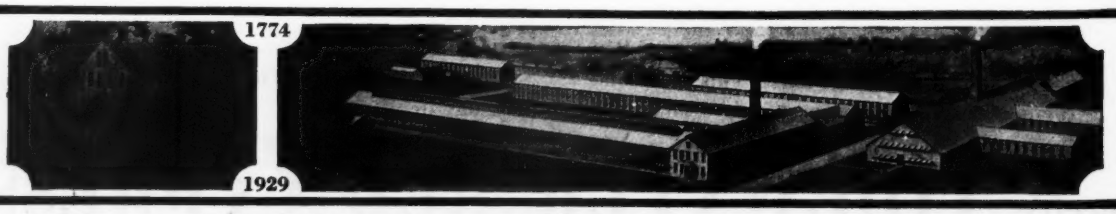
THE WOOD ETERNAL

The Standard for Service

MORE
AMES SHOVELS
are *USED* than any other kind

The complete "All Star" Ames line covers every shovel need. It will pay you to "look for the stars" on every shovel you buy.





AMES SHOVEL AND TOOL COMPANY
NORTH EASTON ◂▸ MASSACHUSETTS
ST. LOUIS, MISSOURI . . . ANDERSON, INDIANA

3062

Economy

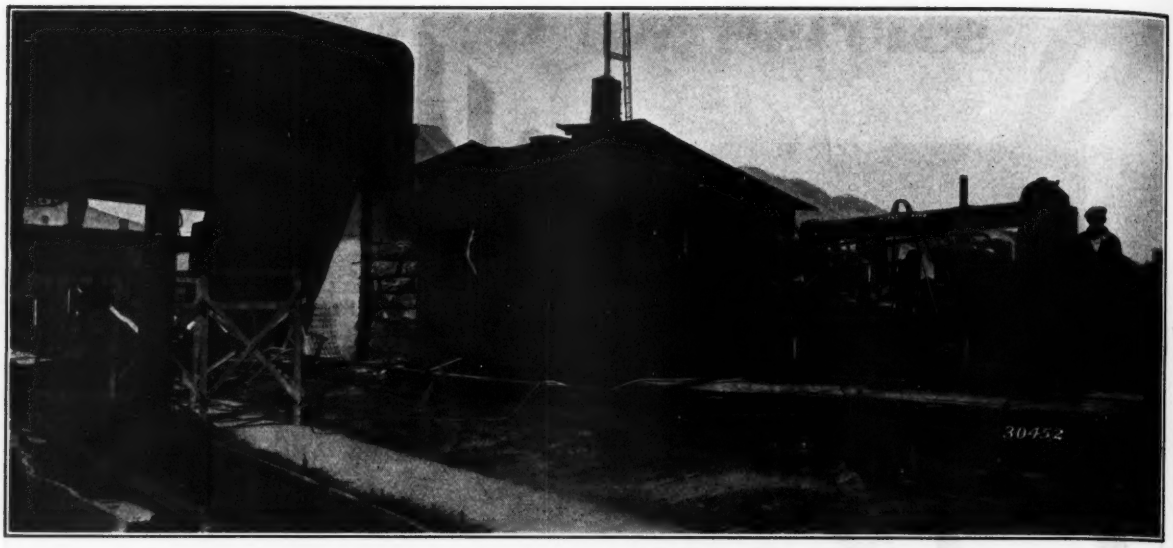
IT'S economy—a real saving in dollars and cents, to buy Headfree Joints. They tend to reduce rail batter; thus reducing the expense of building up rail ends or the sawing of rail. Headfree Joints last longer. They maintain the ends of the rail during its life and reduce the percentage of breakages.

You save rail and save joints.

Headfree Continuous Joint with Canted Abrasion Plate



THE RAIL JOINT COMPANY
165 BROADWAY, NEW YORK, N. Y.
Always A Better Rail Fastening



One of the I-R Compressors supplying air for bridge repair work. Compressor is mounted on skids.



Two of the seven hammers used on the work.



Guniting an abutment after the old mortar had been cleaned.

Bridge Repair with Compressed Air

The accompanying illustrations show the application of compressed air equipment on a bridge repair job undertaken by one of the leading Eastern railroads. Pneumatic equipment made it possible to quickly rebuild the bridge and put it in a safe condition.

Pneumatic chipping hammers were used for cleaning out the soft mortar between the abutment stones and also for cutting concrete from under the bridge floor prior to Guniting. The air was supplied by two 9″ x 8″ Ingersoll-Rand Portable Compressors.

INGERSOLL-RAND COMPANY
11 Broadway New York City

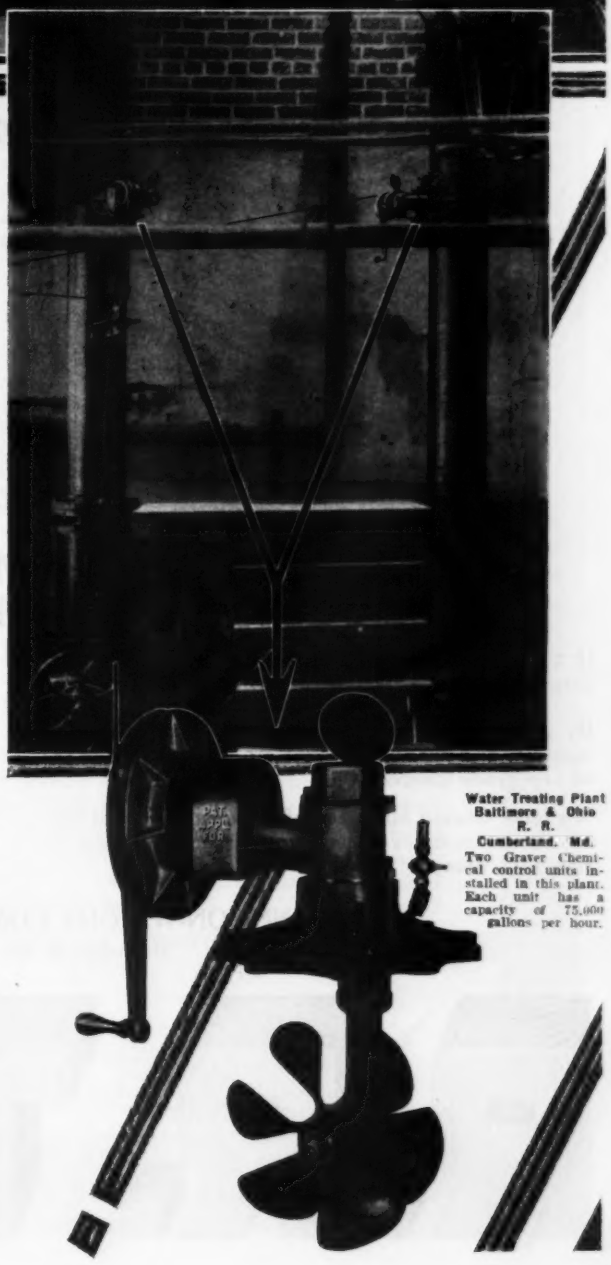
Branches or distributors in principal cities the world over

For Canada Refer—Canadian Ingersoll-Rand Co., Limited, 10 Phillips Square, Montreal, Quebec.

269-TT

Ingersoll-Rand





Water Treating Plant
Baltimore & Ohio
R. R.
Cumberland, Md.
Two Graver Chemical control units installed in this plant. Each unit has a capacity of 75,000 gallons per hour.

ACCURATE CHEMICAL CONTROL *with*

GRAVER

Water Softeners

Accuracy of chemical control has always been a notable feature of Graver Water Softeners. Just as other mechanical equipment has been improved, so have refinements been made with the Graver Control.

Operating conditions of a softener and the operator's judgment have always been reflected to a greater or less extent in the accuracy of treatment. The presence of sediment in the water—varying rates and sudden changes in the flow of untreated water into the softener—have done their share in disturbing a smooth and accurate operation of any control mechanism.

The new Graver Control has overcome these difficulties. It is as "failure-proof" as is possible to build a piece of mechanical equipment. It is so simple in its operation that the most unskilled help can attend to it—muddy water in no wise affects the accuracy.

This new Graver Control is actuated by a commercial water meter installed on the inlet line of the softener. The type of meter is determined by the size of softener. Flow of water into the softener causes an immediate flow of chemicals—controlled accurately and solely by the rotating members of the meter. In addition to controlling the addition of chemicals, the meter also registers the amount of water treated.

This chemical control equipment is furnished with all Graver lime-soda softeners. In addition, it can be furnished to replace the older, more complex and less accurate control in use with your present equipment. A complete description of this new chemical control is contained in each of two new bulletins:

5049—Graver Hot Process Softener
5079—Graver Cold Process Softener

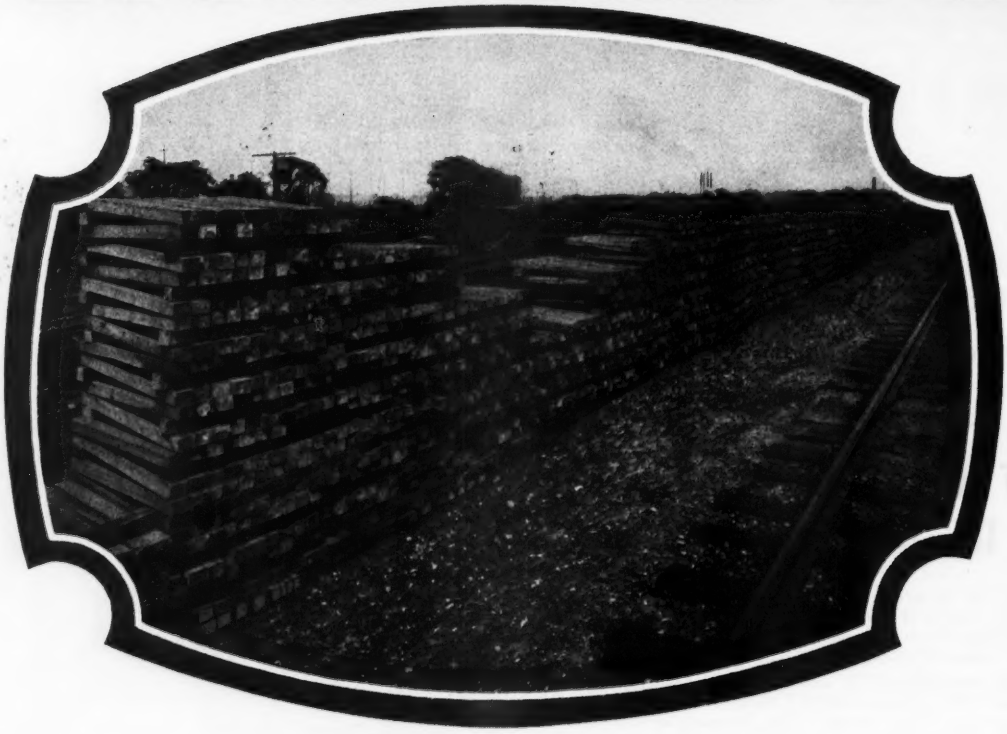
We will gladly send either or both publications
Or better still, if you have no new installations planned on which you wish information and prices—send us particulars (maximum rated capacity, size of inlet line, etc.) regarding your treating plants which are giving trouble and we will send you a proposal containing complete information and showing how little this modern, accurate equipment will cost.

Railroad Service Division

GRAVER *Founded 1857* *Corporation*

2000 Todd Ave., East Chicago, Indiana

KREOLITE



LIFE OF TREATED TIMBER DEPENDS UPON CHARACTER OF PRESERVATIVE USED

In order to insure the purchaser of a pure and uniform product, *we distill all of our own creosote oil.*

By our own method of distillation, it is possible to insure to the purchaser a uniform, pure Creosote Oil of any grade desired.

We have treated hundreds of millions of feet of timber in the past seventeen years without a single instance of decay.

Enormous stocks of Railroad Cross Ties, Switch Ties, Structural Timbers and Piling, in all sizes, in Solid Oak or Pine, properly sticked, stacked, and air seasoned before treatment, available for prompt shipment from Toledo, Ohio, or our Midland Creosoting Company plant at Granite City, Ill. (East St. Louis).

We specialize in framing timbers to your plan before treatment.

Quick shipment on short notice.

THE JENNISON-WRIGHT COMPANY, TOLEDO, OHIO

Branches in All Large Cities

R.R. TIES



FLEXIBILITY

The Keynote of the Buckeye's Exceptional Earning Power

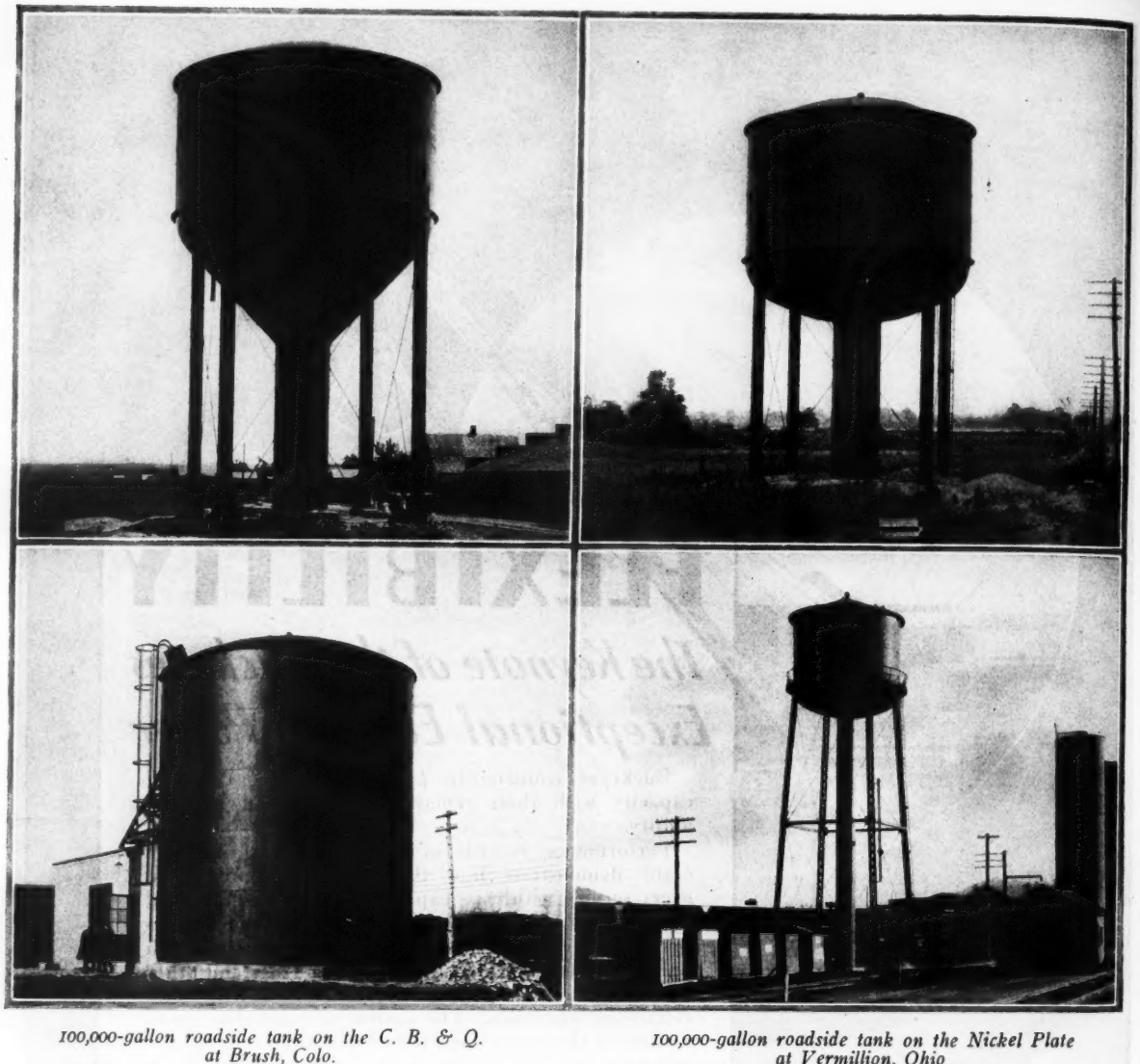
Buckeyes consistently prove their great earning capacity with their remarkably diversified working ability.

Performance records of this compact, fast, little crane demonstrate how thoroughly it conforms to every service within its capacity. It can be employed efficiently as a clamshell, dragline, backfiller or orange-peel or as a crane (being quickly convertible), on such operations as handling full-length rail, frogs and other heavy units or for loading, unloading and shifting miscellaneous materials. The variety of profitable applications of this equipment is really limited only by the ingenuity of its operators in adapting it to their problems.

The Buckeye Utility Crane is available in two mountings: Twin full-length Alligator (crawler traction) wheels for duty independent of rails, and flanged wheels for service from track or rails laid on flat cars. Standard features which make it particularly desirable for railway service include, among others, two-speed main transmission, providing dual speeds for every operation; adjustable length boom; full-circle swing; and heavy-duty, gasoline motor. Interesting literature, giving complete construction details and performance data, gladly sent on request.

The Buckeye Traction Ditcher Co.
FINDLAY, OHIO
There's a Buckeye Sales and Service Office Near You

for over thirty years
Buckeye



100,000-gallon roadside tank on the C. B. & Q. at Brush, Colo.
138,000-gallon softening tank on the B. & O. at Ottawa, Ohio.

100,000-gallon roadside tank on the Nickel Plate at Vermillion, Ohio.
50,000-gallon general service tank on the A. T. & S. Fe at Williams, Ariz.

Elevated STEEL Roadside Delivery Tanks—Horton tanks for roadside delivery service are built with either conical or ellipsoidal bottoms. Both designs have large steel risers. (Usually 6 feet) Piping connections are extended several feet above the bottom of the riser. Clean water is delivered to locomotives, as settlings collect below the outlet pipe and flushed out through a wash-out valve without taking the tank out of service.

Flat-bottom STEEL Water Storage Tanks—Flat-bottom steel storage tanks are used for railway water service where it is not necessary for the contents to flow from cranes by gravity. They are made in standard sizes or with special dimensions to meet local requirements. This type of tank is also used on oil burning roads to store fuel oil. Such installations may be equipped with Wiggins Floating Roofs for fire protection.

STEEL Tanks for General Service—Elevated steel tanks provide a dependable water supply at gravity pressure for general service and fire protection of railroad property. The height to bottom of such installations is governed by the pressure required.

Ask our nearest office for any information you desire about steel tanks or for estimating prices on installations your road is considering.

CHICAGO BRIDGE & IRON WORKS

Chicago.....2452 Old Colony Bldg.
New York..3156 Hudson Term. Bldg.
Cleveland.....2202 Union Trust Bldg.
Dallas.....3309 Magnolia Bldg.
Detroit.....1519 Lafayette Bldg.
Philadelphia.....1609 Jefferson Bldg.
Atlanta.....1036 Healey Bldg.
San Francisco.....1007 Rialto Bldg.

B-101

HORTON TANKS

Get these Profits *from* Protection

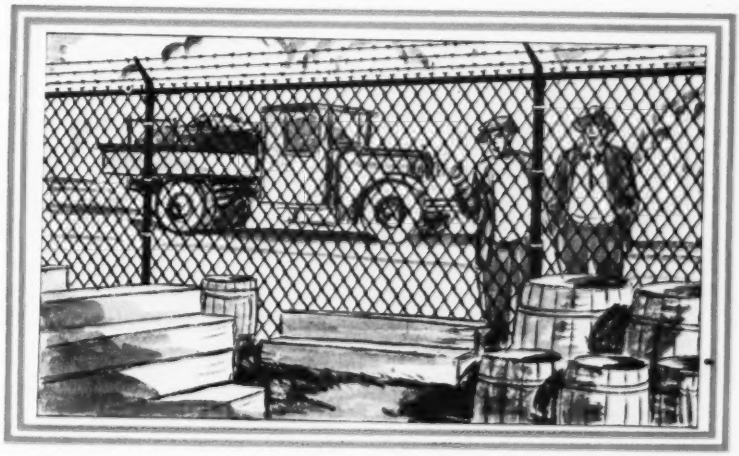


Trespassers — either careless or malicious—are safe where a sturdy barrier of Page Fence stands guard. Switch yards and other danger spots become absolutely safe when guarded by Page Fence. Children and other persons ignorant of possible danger are protected. Damage claims and other losses are turned into profits.



Protect the Public

Tool supplies, coal and materials are safe inside an enclosure of non-climbable Page Chain Link Fence. It protects the grounds and provides adequate security for buildings.



No more missing material

Page protection provides a definite check on both employees and the public. One way in or out promotes order — simplifies discipline — and gives a positive control on equipment and material.



One way IN or OUT—for EVERYONE

—on the next page read about Page Fence Association plan service

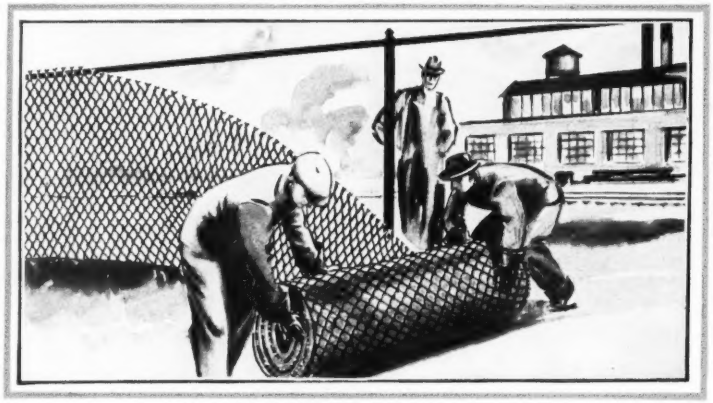
Let the Page Fence Association Serve You in Planning Protection

NOW!



Near you is a member of the Page Fence Association—a group of fence experts ready to give you full advantage of 46 years' Page experience and the 53 Service Organizations that form the Association. Anyone interested in better property protection will want the information available through the Association. Your name and address bring it. There is no obligation.

Experts on protection give individual assistance



There are two essentials to lasting fence service—

1. Good material
2. Expert erection

The Page Fence Association assures erection service by crews trained to meet LOCAL conditions.

Trained erection crews assure lasting service

America's Wire Fence

STEEL AND WIRE PAGE QUALITY PRODUCTS

First Since 1883

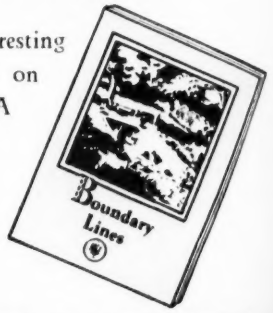
nation-wide service through 53 service plants

Local Organizations that depend on YOUR satisfaction

The Page Fence Association member who serves you has a business centered right in your locality. They know that you, as a satisfied customer, are the best advertisement they can have for their business.

This PROTECTION plan book is yours—no obligation

"Boundary Lines" is an interesting book full of valuable facts on boundary line protection. A copy is yours for the asking. Write the Page Fence Association, 520 No. Michigan Avenue, Chicago, Illinois.



***Investigate!**

Page Fabric available in Copperweld wire—no upkeep—non-rusting lifetime service.

PAGE CHAIN LINK *Galvanized or Copperweld Ornamental Wrought Iron* **FENCE**



4 times faster than by hand!

Here is a picture of a typical gang of men, each equipped with a SYNTRON Electric Tie Tamper, tamping ballast better than any crew with tamping picks or bars, *and doing it four times faster than by hand.*

The SYNTRON Portable Power Unit rests on the berm. This Power Unit is only 20 inches in width, is easily moved by four or five men, and is equipped with dolly wheels for riding on a rail. No special cribbing needed. Will clear in narrow cuts and on narrow fills. No cranes required to move the Unit.

In addition to tampers, the Unit operates a large number of electrical labor-saving devices.

Investigate the SYNTRON OUTFIT. You will be glad you did.

SYNTRON COMPANY, 400 Lexington Ave., PITTSBURGH, PA.

SYNTRON

Electric Tie·Tamping Outfits

At the

Joint Convention

this month

be sure to visit

the Carey Exhibit!

The booth number is 57

Examine, first-hand, the famous Carey *Elastite* products . . . *which so many engineers and contractors are using and recommending!*

Carey Elastite Crossing Pavement . . . sections of Carey Elastite Rail Filler and Carey Asphalt Plank, both made of a fibrous asphaltic compound that knits and heals under traffic.

Carey Elastite Asphalt Plank . . . a fibrous asphaltic compound, accurately shaped into preformed planks, delivered ready to install. Quiets bridge noises, dampens structural vibration.

Carey Elastite Water-proofing Protection . . . preformed asphaltic slabs of desired lengths, widths and thicknesses. Bonded on hot or cold—impervious to moisture or climatic changes.

Carey Elastite System of Track Insulation . . . asphaltic units preformed to fit practically any type of rail. A cushion that absorbs stress between tracks and paving—adds to the life of the track.

Carey Elastite Expansion Joint . . . a heavy body of fibrous asphaltic compound sandwiched between holding layers of asphalt-saturated felt. Protects concrete work—protects engineers' reputations.

Carey Elastite Trunking . . . permanent protection for signal wires. Fire-resisting, weather-proof, safe for insulation—a remarkable improvement over old-type wooden cable trunking.

THE PHILIP CAREY COMPANY · *Lockland,* CINCINNATI, OHIO

Carey Elastite

REG. U.S. PAT. OFF. TRADE MARK REG'D U.S. PATENT OFFICE

PRODUCTS

Load Capacities Increased 25-50%



No. 12-B Sheffield trailer. Two Timken Bearings in each wheel. Sheffield section motor cars are also Timken equipped, including motor.

TIMKEN BEARING EQUIPPED

By means of several improvements in design, including the adoption of Timken Bearings, Fairbanks, Morse & Company, Chicago, builders of "Sheffield" maintenance equipment cars, have been able to increase the load rating of their No. 12-B trailer from 8,000 to 10,000 pounds, and that of their No. 4-B trailer from 4,000 to 6,000 pounds . . . *without reducing the original safety factor.*

In common with builders of all types of railroad rolling stock and shop equipment, they have found in Timken *the one bearing that does all things well* . . . whether the loads are all *radial* . . . all *thrust* . . . *or a combination of both.*

Timken economies follow in the wake of Timken endurance. Friction is eliminated, power saved, efficiency preserved, upkeep costs materially lowered by the exclusive combination of Timken tapered construction . . . Timken *POSITIVELY ALIGNED ROLLS* . . . and Timken steel.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN *Tapered Roller* **BEARINGS**

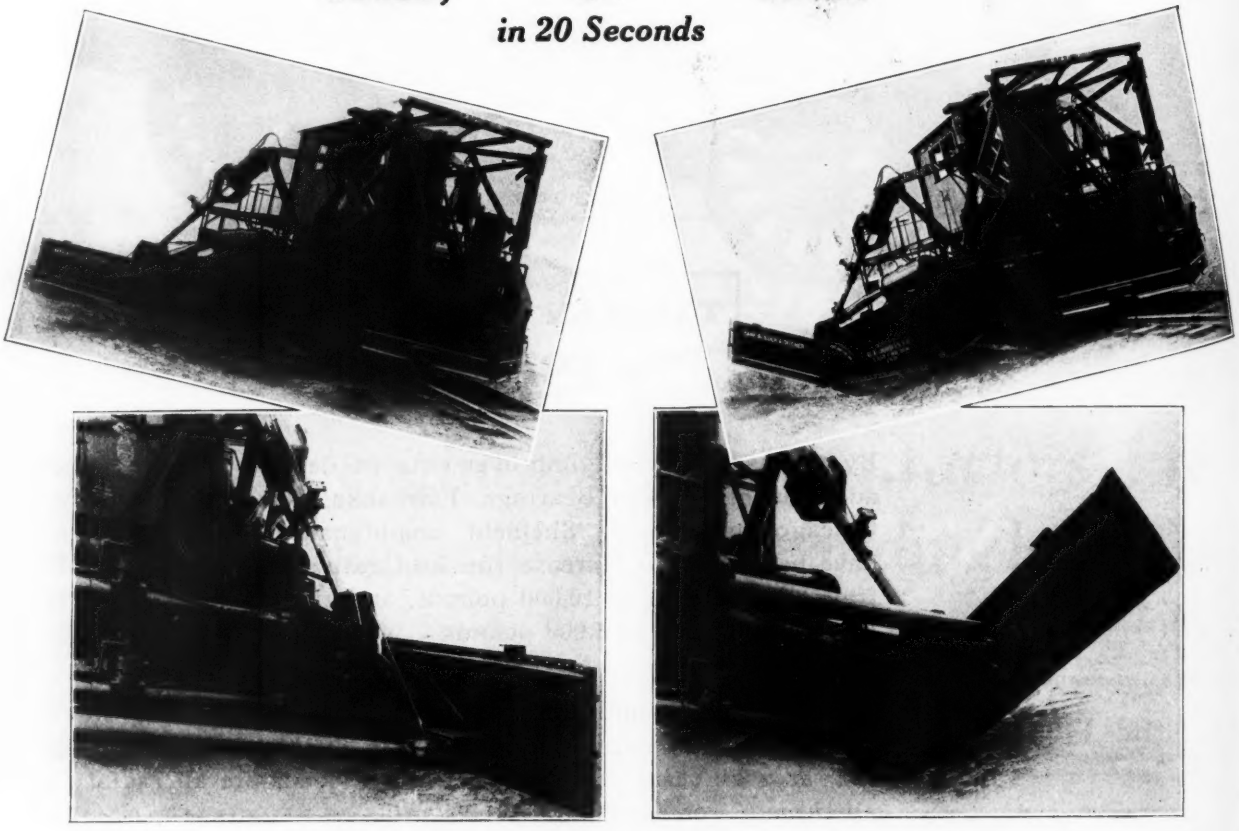
JORDAN SPREADER

A SPREADER AND DITCHER IN ONE

Do you know that the new type "A" Jordan can be made either a Spreader or a Ditcher in a jiffy?

THIS, or THIS

in 20 Seconds



A grade can be established in a ditch bottom without disturbing the subgrade or ballast slopes by means of a mechanically operated ditch cutting section. This can be done from the operator's cab.

JORDAN SPREADER
"Does the Work of an Army of Men"
SNOW PLOW · ICE CUTTER · DITCHER
O. F. JORDAN COMPANY
WALTER J. RILEY, PRESIDENT
EAST CHICAGO, INDIANA

Wing braces are telescopic and wing can be set to any width within the maximum spread from operator's cab.

RAILS & SPLICES



Into every rail and splice bar manufactured by this company the name "Carnegie" is rolled. This name on steel represents years of conscientious effort to give steel users better products—it represents control of manufacture from the mining of the ore to finished product—it represents unlimited facilities for proper manufacture—it represents the work of experienced metallurgists—the pride of skilled workmen in their craft. It represents a friendly spirit of service and cooperation. Carnegie Rails and high carbon, oil quenched Splice Bars bear this name—our guarantee of your satisfaction. Whether your order be small or large, you may expect the same prompt and efficient service.

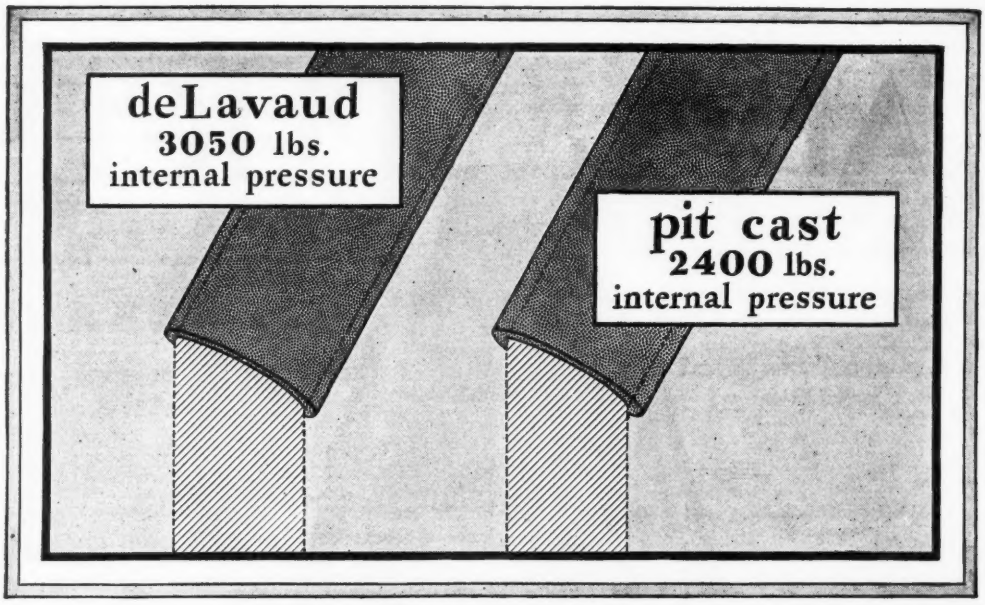
Let us quote on your next requirements

CARNEGIE STEEL COMPANY

Subsidiary of United States Steel Corporation

CARNEGIE BUILDING ∽ PITTSBURGH, PA.

10



deLavaud...the pipe of greater carrying capacity and greater strength

THE diagram shown above graphically tells the story of deLavaud's superiority over pit cast pipe. These two sections have precisely the same outside diameter. Note, however, that the deLavaud pipe has a greater inside diameter and therefore a greater carrying capacity. Yet, *exhaustive tests have proved that deLavaud pipe is more than 25% stronger* than any pit cast iron pipe.

In hydraulic bursting tests conducted by a well-known authority deLavaud pipe proved its superior strength by resisting an internal pressure of more than 3000 lbs. per squ. in. This was far greater pressure than pit cast pipe withstood.

Cast iron pipe made by this Company bears the "Q-check" trademark of The Cast Iron Pipe Research Association.

The remarkable strength of deLavaud pipe results from the dense, close grained structure of the metal, and from its freedom from slag and blow holes. deLavaud pipe is made by pouring molten iron into a rapidly revolving cylindrical mould. Centrifugal force holds metal against sides of mould, *driving out impurities with a force 40 times greater than gravity.*

Also, the action of water-cooled deLavaud mould and the subsequent annealing further improve the physical properties and the microstructure of the metal. Let us send you the deLavaud handbook and the complete facts and figures about deLavaud pipe.

United States Pipe and Foundry Co., Burlington, New Jersey

Sales Offices: New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

CP COMPRESSORS Recently Installed By Three Large Railroads



These installations are repeat orders from three prominent railroads whose experience with CP Compressors has proved their reliability and high sustained efficiency.



C-283



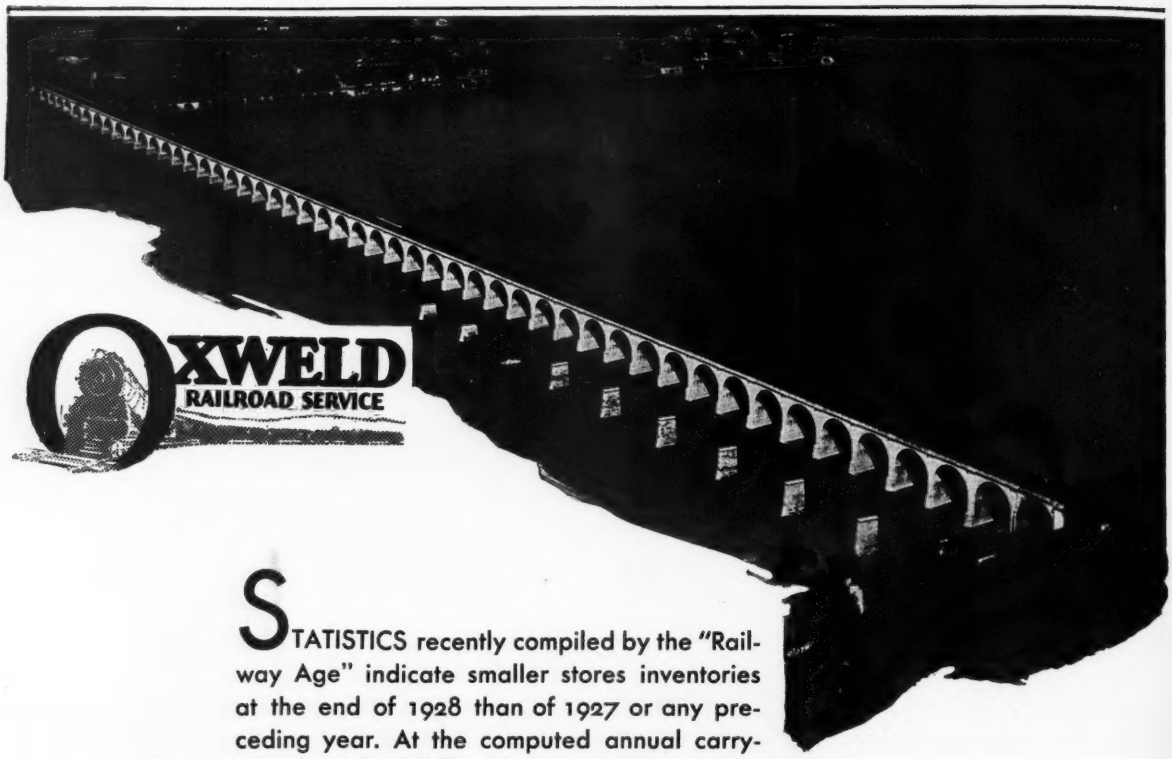
The Simplate Air Valve; the piston type of steam valve; efficient regulation of both the steam and motor-driven types; sturdy construction; reliable automatic lubrication and world-wide CP service facilities are some of the reasons why CP Compressors are preferred by Railroad engineers.

There is a CP Compressor, stationary or portable, in steam, oil, belt or direct motor driven type, for every compressed air purpose. Write for literature.

Chicago Pneumatic Tool Co.
Railroad Dept.

6 East 44th St. - - - - - - - New York
310 S. Michigan Ave. - - - - - Chicago
1004 Mutual Bldg. - - - - Richmond, Va.
175 First St. - - - - - - San Francisco
Terminal Tower - - - - - - Cleveland

Smaller Inventories



STATISTICS recently compiled by the "Railway Age" indicate smaller stores inventories at the end of 1928 than of 1927 or any preceding year. At the computed annual carrying cost of 18½%, this reduction of stocks effected an economy in 1928 of $10,000,000 as compared with 1927 and $53,000,000 as compared with 1920.



During 1928 American railroads continued largely to increase their use of the oxwelding process, thus minimizing replacements and enabling operation with smaller inventories.

For more than 16 years The Oxweld Railroad Service Company has supplied the welding needs of a majority of the important railroads of the country. It is a vital factor in lowering railway operating costs.

THE OXWELD RAILROAD SERVICE CO.
Unit of Union Carbide and Carbon Corporation
UCC

NEW YORK CITY
Carbide and Carbon Bldg.

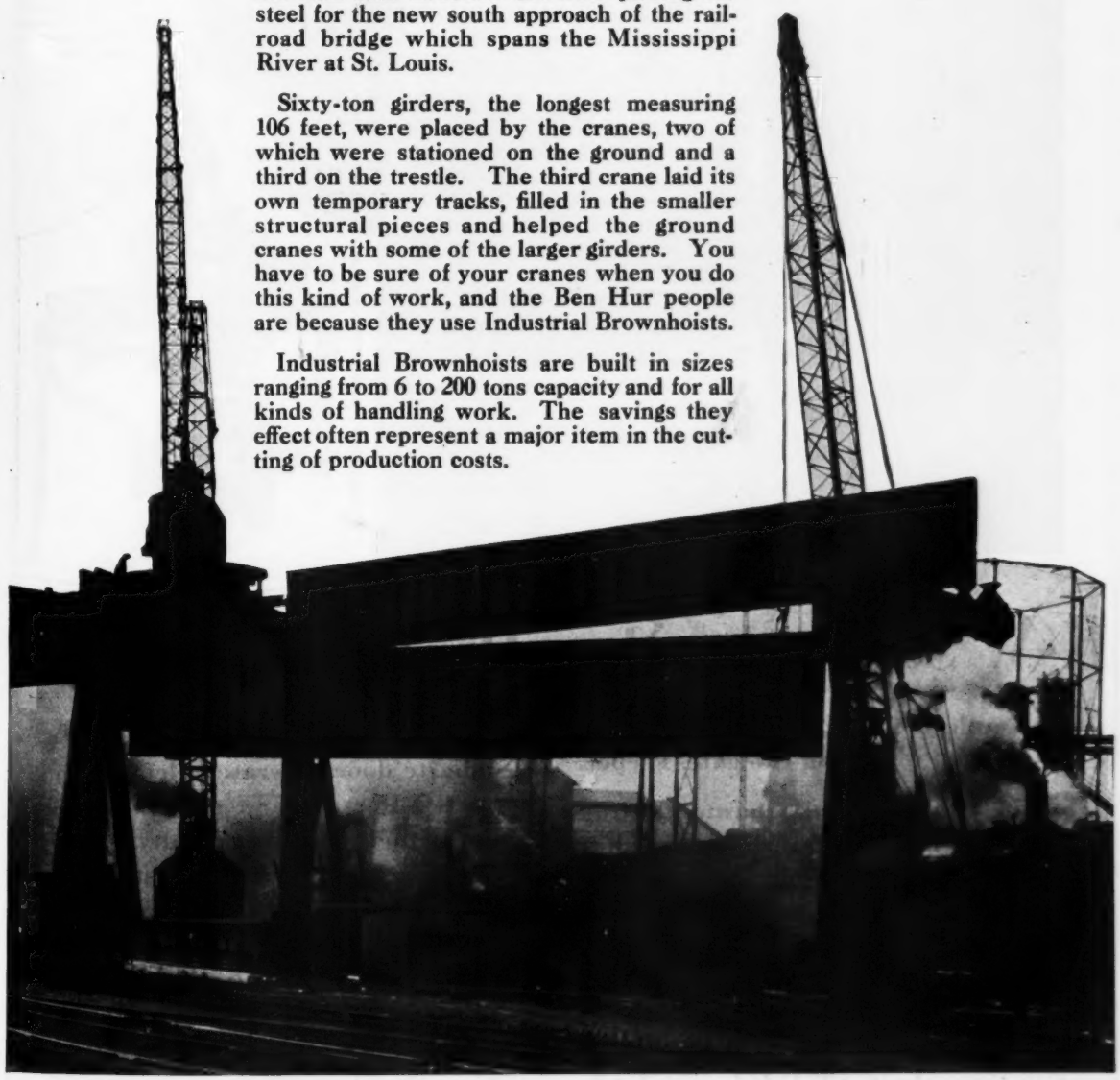
CHICAGO
Carbide and Carbon Bldg.

You've Got to be Sure of Your Cranes on This Kind of Work

Railroad tracks had to be kept open for constant use, factory buildings to be spanned without interruption to operations and the mercury at times showed close to zero while the Ben Hur Erection Co. were placing the steel for the new south approach of the railroad bridge which spans the Mississippi River at St. Louis.

Sixty-ton girders, the longest measuring 106 feet, were placed by the cranes, two of which were stationed on the ground and a third on the trestle. The third crane laid its own temporary tracks, filled in the smaller structural pieces and helped the ground cranes with some of the larger girders. You have to be sure of your cranes when you do this kind of work, and the Ben Hur people are because they use Industrial Brownhoists.

Industrial Brownhoists are built in sizes ranging from 6 to 200 tons capacity and for all kinds of handling work. The savings they effect often represent a major item in the cutting of production costs.



Industrial Brownhoist Corporation, General Offices, Cleveland, Ohio

District Offices: New York, Philadelphia, Pittsburgh, Detroit, Chicago, New Orleans, San Francisco, Cleveland.

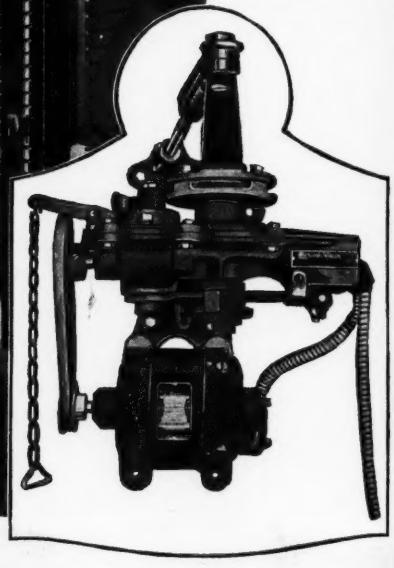
Plants: Brownhoist Division, Cleveland; Industrial Division, Bay City, Michigan; Elyria Foundry Division, Elyria, Ohio.

INDUSTRIAL BROWNHOIST



"Quality leaves its imprint"

This 700-lb. ornamental iron gate at the traffic entrance of the Owens Bottle Co. is equipped with R-W Slidetite and Aut-O-Dor electric operator.



R-W Solves Another Door-Way Problem

This unique factory entrance pays for itself by eliminating the gate-keeper.

The two beautiful ornamental iron gates (each weighing 350 pounds) slide inside the opening on Slidetite equipment and are operated by the R-W Aut-O-Dor Electric Operator. The gates open and shut by simply pressing a button inside the office. Thus traffic entering and leaving the Owens Bottle Company plant at Toledo is completely in control of one man . . . yet he never has to leave his desk by the window.

Slidetite doors operated electrically by Aut-O-Dor are first choice everywhere for factories, garages, any and all door-way requirements, unobstructed openings, up to 22 feet wide. Slidetite powered by Aut-O-Dor is admittedly the most satisfactory door-way equipment for sturdiness, safety and security.

Write today for illustrated literature and specifications. Call upon an R-W engineer at any time for advice.

Richards-Wilcox Mfg. Co.

A Hanger for any Door that Slides

New York . . . . AURORA, ILLINOIS, U.S.A. . . . . Chicago

Boston Philadelphia Cleveland Cincinnati Indianapolis St. Louis New Orleans Des Moines Minneapolis Kansas City Atlanta Los Angeles San Francisco Omaha Seattle Detroit

Montreal · RICHARDS-WILCOX CANADIAN CO., LTD., LONDON, ONT. · Winnipeg

QUALITY

1- In the manufacture of rail anti-creepers this Company has always maintained that quality should be given preeminence.

2- The Fair Rail Anti-Creeper is manufactured with that thought in mind, for the material used in its construction is the most suitable and best obtainable. Through engineering skill it has been scientifically designed and is basically correct, and it is manufactured under the most approved methods.

3- That it is distinctive from all others is unquestionable, and it is acknowledged as a most simple and effective rail anti-creeper.



The FAIR Rail Anti Creeper

THE P. & M. CO.

NEW YORK Paris London Sydney Calcutta Montreal CHICAGO



Station platform of the Chicago and North Western Rwy., at Evanston, Illinois, shown above, where STONHARD RESURFACER is doing service.

STATION PLATFORMS

and other concrete, brick, and wood-block surfaces may be repaired and ready for use in 36 hours.

Stonhard Resurfacer

is already serving 50 railroads and thousands of industrial plants and is the satisfactory solution to their concrete maintenance problems.

Merely sweep out the dust and dirt from the "bad spot", apply the STONHARD Bonding Coat, then the STONHARD mixture.



No { Chipping and Chopping / Air-Hammering / Heating of materials / Expert labor

STONHARD RESURFACER provides a repair that is tight-sticking, resilient, and enduring —a repair that will actually protect the adjoining area.

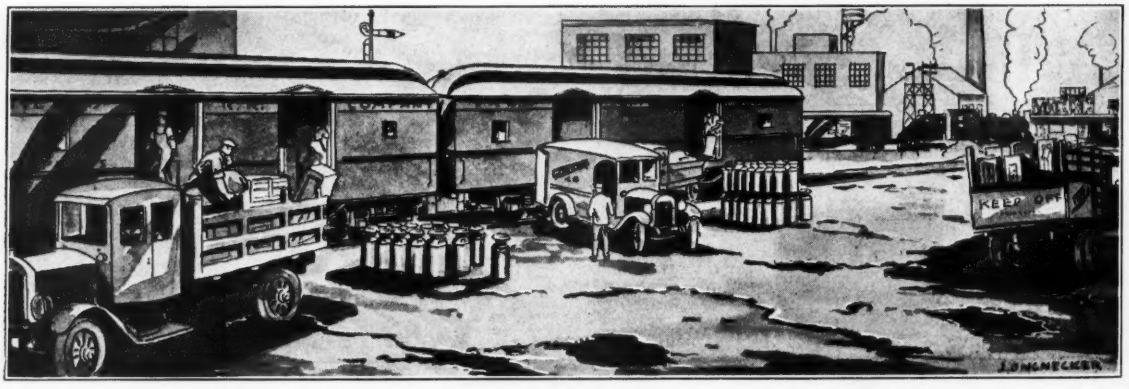
Send for a copy of "OVER THE ROUGH SPOTS", 24-page booklet.

AND NOW

SURBOND

FOR REPAIRING YOUR DRIVEWAYS

NO MIXING OR HEATING OF MATERIALS · NO DELAYS
TRAFFIC MAY BE RESUMED IMMEDIATELY AFTER REPAIRS



One of the first tests with SURBOND was in the driveway of a prominent automobile plant operating 24 hours a day, where 5-ton trucks with trailers, hauling castings, passed over a newly-made repair within 5 MINUTES after application without injury to the repaired section.

They have since sent us repeat orders. (Name upon request.)

Send for additional information on

SURBOND

OR BETTER STILL, LET US SHIP A BARREL WITH THE UNDERSTANDING THAT THERE IS "NO CHARGE UNLESS SATISFACTORY".

Detroit
Cleveland

STONHARD COMPANY

Canal and Poplar Sts., Philadelphia, Pa.

Philadelphia
San Francisco



The Tamping Gang

Is left behind!

ON the day this photograph was taken, 677 feet were being raised per hour by one man operating the Nordberg Power Jack.

The force was short about twelve men. When a full gang is on the job, and the Power Jack is really pushed, it has made as high as 1000 feet in an hour.

The Nordberg Power Jack Machine not only takes the place of eight hand jack men and two jack hole diggers, but works two to three times as fast.

Further data and full information on the Nordberg Power Jack and its operation, gladly sent on request.

NORDBERG MFG. CO.

Milwaukee, Wis. London, Eng.

NORDBERG

SAVES TIME AND LABOR-REDUCES TRACK MAINTENANCE EXPENSES

POWER JACK

No. 9 of a series

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ADDRESS REPLY TO
105 WEST ADAMS ST.
CHICAGO, ILL.

Subject: THE COST OF YOUR PAPER

Dear Reader: August 29, 1929
Everywhere

When you send us your check for $2 for your year's subscription to Railway Engineering and Maintenance I suppose you are under the impression that you are paying for the paper. And of course you are, in a way. However, I wonder if you realize that in return for this $2 we actually spend $10 to deliver the 12 issues of our publication to you. In other words, we are giving you a service which costs us $5 for each $1 we receive from you, after excluding all advertising sales expenses.

Take the item of postage, for instance. Of your $2 Uncle Sam takes 30 cents for delivering the magazine to you, and for those of you who live on the Pacific Coast he takes nearly four times that amount. It costs us 45 cents more to record your subscription, notify you of its expiration and wrap and address your copies. The paper used in your 12 issues costs 68 cents while the printer charges us $1.80 for his work. To this must be added 30 cents for drawings and engravings. These purely mechanical charges total nearly twice the amount that we receive from you.

Yet we have included nothing for the salaries and traveling expenses of the editorial staff which collects and prepares the material for the printer. This expense again exceeds the amount that you pay for your subscription. When to these are added the cost of rent, light and office supplies and the numerous other expenses that arise in the publication of a paper such as ours, you can see how the total approximates five times the amount which you send us.

How can we do this, you ask? Only in one way—through the advertising that is attracted into our pages by reason of the fact that you are a subscriber. In order to get their sales messages before you, the manufacturers of the equipment which you use patronize the advertising columns of Railway Engineering and Maintenance and it is by reason of this patronage that you are able to receive this magazine at a fraction of its cost. Possibly this thought may give you a greater interest in the advertisements in this and succeeding issues.

Yours truly,

ETH*MM

Elmer T. Howson
Editor.

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deserved

Leadership



Constant improvement and refinement of the Bethlehem New Century Switch Stand have given it a position well in advance of the field. These improvements never affect the interchangeability of parts of the stand but are always developed in such manner that they may be applied to stands already in service. As a result, Bethlehem stands that have been in service many years may be modernized, and changed to keep pace with improvements in track equipment, at slight expense.

The Bethlehem New Century Switch Stand is a low, parallel-throw stand of unusually heavy steel construction. It is recommended for all points of heavy traffic on main lines or in yards.

The leadership of Bethlehem New Century Switch Stands is best evidenced by the many railroads on which this design has been adopted as standard equipment.

Catalog on request

Bethlehem New Century Switch Stand with target and plug lamp tip. A parallel-throw stand that is positive when latched and automatic when unlatched. Furnished in either adjustable or non-adjustable models.

BETHLEHEM STEEL COMPANY
General Offices, BETHLEHEM, PA.

DISTRICT OFFICES

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh Buffalo Cleveland Detroit Cincinnati Chicago St. Louis San Francisco Los Angeles Seattle Portland Honolulu

Bethlehem Steel Export Corporation, 25 Broadway, New York City
Sole Exporters of Our Commercial Products

BETHLEHEM
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CONTENTS FOR SEPTEMBER, 1929

Editorials 367
Watch the highways—The best way to cut a rail—The value of conventions

Prize Winning Homes..... 370
How foremen on St. Louis Southwestern have developed model homes from section houses

Building Concrete Slabs from Below..... 375
How a difficult maintenance job was handled on the Illinois Central

Reducing Accidents on the P. & L. E.... 378
This road made a record despite dense traffic and heavy labor turnover

Heating Creosote for Adzed Ties..... 381
Home-made equipment reduced labor and gave excellent results

Tie Records of Rocky Mountain Woods 382
Forest Products Laboratory studies relative merits of various species

Raising a Concrete Trestle..... 385
Burlington develops method to eliminate removal of tracks and slabs

How Paint Retards Weathering..... 386
Wood fiber destroyed without decay by rapid changes in moisture content

Depositing Concrete in a Deep Well..... 387
Block of ice acts as valve for concrete bucket

Hold Rail Cutting Contest..... 389
Pennsylvania finds best way to cut a rail

Handy Wrench for Bridge Gangs..... 390

What's the Answer?..... 391

New and Improved Devices..... 398

What Our Readers Think..... 400

New Books 400

With the Associations..... 401

Railway News Briefly Told..... 402

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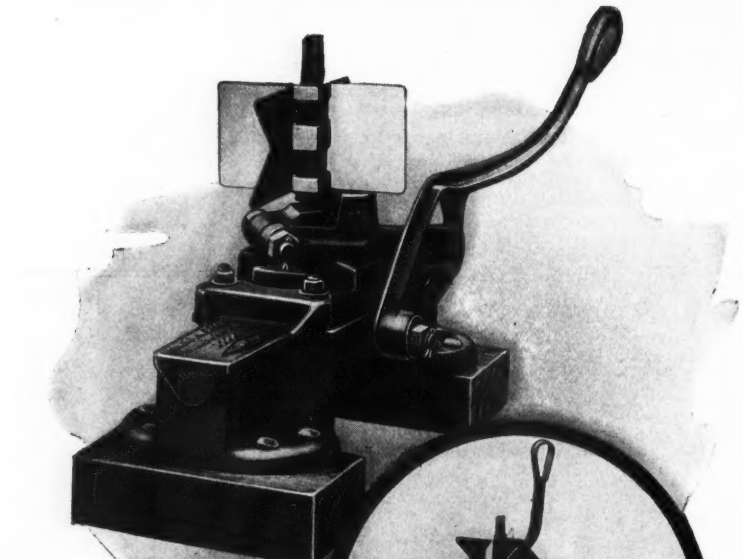
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Railway Engineering and Maintenance

Volume 25 September, 1929 No. 9

Watch the Highways

THE wrecking of a passenger train on the Chicago, Rock Island & Pacific near Stratton, Colo., on July 18 is of particular concern to maintenance of way officers by reason of the fact that it directs attention to a hazard that is becoming more common. This accident, which resulted in the death of 8 passengers and 2 employees and the injury of 39 passengers, was caused by the weakening of the embankment adjacent to a bridge crossing an arroyo. This structure consisted of an 85-ft. girder span supported on concrete abutments and provided an opening sufficient to carry the drainage from an area of more than 130 square miles.

Some three or four years ago an improved highway was built parallel to and on the upstream side of the railway in which an opening of only 287 ft. was provided at the arroyo or sufficient to carry the water from a drainage area of less than 5 square miles. Furthermore, this bridge was placed at right angles with the highway rather than with the stream, reducing the effective area of the opening at least 25 per cent.

On the night of the accident a cloud-burst occurred some 20 miles upstream, bringing a flood of water down against the highway bridge which backed it up until the structure gave way. By reason of its angle with the stream this bridge then deflected the water against the toe of the railway embankment instead of permitting it to follow its normal course, cutting away the toe of the slope and weakening the track.

With the increase in highway construction throughout the country, much of it paralleled to and commonly on the upstream side of the railway, the number of situations like that existing at Stratton is being multiplied rapidly. For this reason local division engineers and bridge supervisors should make it a part of their duty to be fully informed, at all times, regarding highway work projected as well as under construction. As far as possible they should acquaint themselves with the types, sizes and other essential details of structures being built or projected along lines under their supervision for frequently they can, by reason of their knowledge of local stream conditions, assist the highway officers in avoiding the creation of conditions which will threaten the highway and the railway alike. Where such action is not feasible, they should acquaint the proper officers of their roads with the facts as quickly as possible in order that they may, in turn, arrange for approach to the proper highway officers. By taking such means in time it may be possible to avoid the creation of an unnecessary hazard for railway travel. The initiative, however, rests with the local officers who alone are in touch with such construction.

Water Transportation

Up to 1927 the state of New York had spent more than $230,000,000 on the Barge canal. In that year it carried only 2,581,892 tons of freight, equivalent to not more than seven or eight average train loads per day for the seven months of the year that the canal is in operation—a traffic so small that any one of the railways operating between Buffalo and New York could have handled it without disturbing its present business.

Yet the tax-paying public of the state is required to contribute more than $10,000,000 annually to provide this service—an amount so large that the state would be millions of dollars ahead if it turned all of this traffic over to the railways and paid the current tariff rates therefor and gave the barge operator free transportation.

Practical Morale Building

WHEN a section foreman becomes sufficiently interested in the house which the railway company provides for his use to make extensive improvements to it on his own time; when his wife plants and cultivates flowers and shrubs to make this house more attractive and when by reason of their combined efforts the result is sufficiently outstanding to become an object of pride in the community, that house has become a home for this foreman and the railway has an employee who has made an investment in that community.

The St. Louis Southwestern has recognized the possibilities for the stimulation of morale among its track forces by increasing their interest and co-operation in the improvement of the houses provided for their occupancy and as a result it is effecting economies in the maintenance of its tracks, which, while in large part intangible, are nevertheless real. By means of a carefully thought out program which is described on page 370 in this issue, the Cotton Belt has reduced the abuse to which "company houses" are commonly subjected and in many cases the property has been materially improved, with little expense to the railway.

The greatest benefit has been derived, however, from the change in the attitude of the men themselves, a change which has been reflected in the character of their work. This is evidenced in several ways. In the first place, the tendency of the foremen to migrate from one section to another or to leave the road has been greatly reduced, with the self-evident benefit that results from greater familiarity of a foreman with the characteristics of the track under his supervision, if he remains on his section for a longer period. Even more important how-

ever, is the change in his attitude from that of a "devil-may-care" frame of mind to that of an enthusiastic, happy employee who has made an investment in his job and in his community and who desires to make good in order that he may enjoy the returns on that investment.

One of the encouraging developments in maintenance of way practice today is the increasing interest which supervisory officers are taking in the improvement of the working and living conditions of their men. While many, if not most of the railways still have a long ways to go in this direction before they reach the limit of practical economy, not a few roads have made a start sufficient to show enough returns to encourage further development in this direction.

Will You Attend the Convention?

WITH the Roadmasters Association convening at Chicago on September 17-19 and the Bridge and Building Association meeting at New Orleans, La., on October 15-17, the attention of maintenance of way officers, and particularly of those of division rank, is naturally directed to these meetings and to the possibility of their attending them and participating in the benefits. These two associations are unique among railway organizations in the length of their records of constructive service. Both associations antedate the American Railway Engineering Association by years, the 1929 convention of the Roadmasters Association being its forty-sixth and that of the Bridge and Building Association, its thirty-ninth. Such records are in themselves proof of the places that these organizations have made for themselves as constructive agencies in the collective development of railway practices; they testify also to the value of the work which these associations have been doing through these years.

It has long been conceded that the railways owe much of their progress to the opportunity afforded by associations such as these for the free exchange of experiences regarding practices. In no country in the world has the progress in transportation been as rapid as in America, and in no other country have the associations reached so high a state of development. Yet in spite of this fact one finds a wide variation in attitude among railways and among individual railway men regarding the value of associations. Many roads make it a policy to encourage their maintenance supervisory officers to attend these conventions, while others do not initiate such action but freely permit those who desire to attend. Still other roads restrict their representation to a limited number of their officers, while a few feel that any time that their men spend off their right of way is wasted and discourage or prohibit their attendance. Fortunately for the railways as a whole, the roads which hold the latter attitude are in a small minority, while the number which encourage their men to participate in the work of these associations is increasing.

Not all of the initiative for convention attendance should rest with the managements of the railways, however. That individual will get the most out of a convention who puts the most into it. The alert man who desires to improve his own practices and also fit himself for promotion will recognize the opportunity afforded by the gathering of several hundred men of similar interests and seek to secure permission to attend. Such action is in itself an indication of his progressiveness that not infrequently brings him to the favorable attention of his supervisory officers. The alert maintenance officer will not, therefore, wait until he is told to attend the convention but will take the initiative in asking for permission to attend. Such a man will find a veritable storehouse of practical information in such a meeting which he can bring back to his road and apply to the solution of its problems.

An Interesting Change in Attitude

AN outstanding illustration of the contribution that many manufacturers of materials are making to the knowledge of railway construction practices is afforded by the work done by the manufacturers of corrugated metal culverts. This form of construction is not new for it has long been used in highway drainage work. Here, however, the service was neither so exacting or the selection made with such discrimination as on the railways. As a result the corrugated metal culvert was looked on with wide disfavor by railway men long after it had been accepted very generally in the other fields, and it is not many years since railway men referred to it sarcastically as "wrinkled tin."

Confronted with this attitude, the promoters of this form of construction undertook an extended series of experiments to demonstrate its merit under the exacting conditions of railway service to the satisfaction of railway officers. At the same time it brought to the attention of these railway men a vast amount of scientific information developed in other investigations, with the result that the attitude of railway men has changed very generally from that of credulity to recognition of the fact that this form of construction is entitled to serious consideration. The best evidence of this change in attitude is the fact that the board of directors of the American Railway Engineering Association has instructed its Roadway committee to prepare specifications for this type of culverts, which specifications are now before the association for consideration.

The Worst Job

AN ENGINEER who had gained an enviable reputation as the builder of a great passenger station was once heard to say that he almost hated to see the project completed. When asked to give his reason, he replied that the day the station would be placed in service certain parts of it, such as the train sheds and street bridges over the tracks would start to deteriorate. Coal smoke would cover them with grime and under this action the process of disintegration would continue steadily, regardless of his efforts to provide the best possible protection for the structural members.

If this construction man were depressed at the thought of the corrosion about to commence, how much more discouraging is the lot of the man who must maintain the structure! The fact that such disintegration takes place in spite of every effort to prevent it is bad enough, but the conditions under which inspection and repairs must be done are such as to test the spirit of any man. The work is dirty, it must be carried on in gas-laden air under poor lighting and generally in the face of constant interruptions. It is not surprising that the story of the repair work on a structure like the Illinois Central station at Chicago, told on page 375 of this issue, comprises an account of repeated efforts marked with indifferent success.

Failure is not necessarily an indictment of the materials used. Perhaps it was impossible to get the neces-

sary perfection of workmanship in application under the conditions imposed. Not only must the materials for such protection and repair work be selected with care, but it is equally important to know that they lend themselves to application under unfavorable conditions. Furthermore, it must be known that the work will be done by a force of men skilled and experienced in the special field.

Proper Observance of Slow Orders

IT HAPPENS not infrequently that an old bridge of limited load-carrying capacity must be retained in service, with the result that it is necessary to issue a standing order restricting train speeds to certain maximums for locomotives of different classes. Such slow orders imply that the train will have been retarded to the specified speed before it actually reaches the bridge, but as is well known, there is a tendency to delay the reduction in speed, with the result that the train is still under a heavy brake application when it comes on the bridge.

The retarding force required to stop a train is of no small magnitude, frequently amounting to five per cent of the weight of the train. This force is applied to the rails and, on ordinary roadway, is transmitted through the ties to the ballast. In case of bridges only a few hundred feet long this force is probably carried along the rails and dissipated with the aid of rail anchors in the ballasted track beyond each abutment. But in longer bridges this is out of the question and this braking force must be taken by the bridge itself. This is ordinarily of no importance in bridges supported on low piers, but in the case of high piers or high viaducts, especially old structures in which adequate provision for such forces may not have been made, there is as serious danger of overstress from this cause as from excessive speed. Supervisory officers, who are in the best position to observe infractions of slow orders, should take pains to observe the use of brakes in the vicinity of bridges maintained in service under speed restrictions.

The Section Gang of the Future

FROM the earliest days of track maintenance the section gang has been the basic unit in the organization and all but the heaviest and more or less special work has come within the normal scope of its duties. On some roads, in fact, even such occasional and heavy tasks as the renewal of rail and ballasting are handled through these gangs by either increasing their size or doubling them up temporarily.

In recent years, however, a number of influences have appeared which have tended to modify this organization materially. One of these was the development of the section motor car. By its use the time and physical energy required to transport the gang to and from work was greatly reduced and a very general lengthening of sections resulted. While this tendency was carried too far in some instances and there has since been some recession, the final result has been a distinct increase in the amount of track assigned to a single gang for maintenance.

Another influence has been the gradual change in the character of the track construction. The present almost universal use of treated ties has reduced the renewals on many roads to less than a third of those that formerly prevailed with untreated ties. Heavier rail, likewise, has reduced the amount of work required to maintain the desired surface as well as extending the period between renewals, while tie plates, rail anchors, better ballast and other factors entering into a stronger track construction have contributed to the same trend. All of these have reduced materially the amount of labor required to maintain track to a given standard and have tended to reduce the size of the gangs. Of an opposite character has been the widespread raising of standards of track maintenance during the last few years which has offset in part at least the effect of the stronger track.

Still another influence is the rapidly growing use of labor saving equipment. Some of it, like track liners, is essentially one-man equipment. Others, like rail cranes, are applicable only with larger gangs. Because of this fact and also because the tasks confronting the average section gang are so diverse that it is unable to concentrate on any one operation for more than a limited portion of its time, the percentage of idle time of any unit of equipment assigned to such a gang is high.

To solve this problem, railway men are working along different lines. On one division of one road, adjacent section gangs have been combined to provide larger units which can use mechanical equipment more efficiently and also handle certain tasks without calling aid from neighboring gangs. In another plan, an effort has been made to separate the routine tasks of track patrol, policing, etc., from the larger work of renewing ties, surfacing track, etc., and to assign the former duties to a two or three-man maintenance gang, transferring the men so released into larger gangs which concentrate on the heavier work and for which it is, therefore, practical to provide more equipment.

These experiments are indicative of a growing appreciation that changing conditions are requiring maintenance of way officers to approach the problems of the organization of their forces with an open mind to determine what form of organization meets the present day conditions satisfactorily.

The Best Way to Cut a Rail

AS LONG as steel rails have been used, track men have been confronted with the necessity of cutting them to odd lengths in the field to meet special requirements. From this necessity there have been developed almost as many methods, and modifications of methods, of cutting rails as there are foremen, and the relative merits of these methods have been the subject of the most active debate among their proponents. Yet, among all these methods there must of necessity be some one which is best.

The number of rails that track men are required to cut in the course of a year's work is so large, and the value of the material that may be made useless by inefficient methods is so great, that the determination of the best way of performing this operation is of definite economic interest to the railway. To put an end to the debate regarding the relative merits of the various methods, and to determine the best one in a way that was convincing to all, the Pennsylvania has been conducting a series of elimination contests as described on page 389. At the conclusion of these contests the road should be able to determine the method which can be made standard over the system, and in which the various gangs can then be trained.

The idea which has been followed in the determination of the best method of cutting a rail can be followed to advantage by the railways also in the determination of the most efficient way of performing numerous other tasks, in which there exists a similarly wide variation in practice today.

Do Your Section Foremen's

As Told by H. W. VAN HOVENBERG
Sanitary Engineer, St. Louis Southwestern System



The views above and to the right show the section house at Lewisville, Ark., as it looked in 1921, and its appearance at the close of the campaign of 1928

"I WON'T stay in such a place. I'll tell you just like I'd tell the roadmaster or anybody else, I ain't going to stay." This was the greeting we received at one of our section houses when starting the section house improvement campaign on the St. Louis Southwestern in the spring of 1921. It came from the wife of the foreman on a section where there had always been a continuous change of foremen. Between her remonstrations we managed to tell her that our mission was to make her home more attractive, more livable, and more comfortable, and despite her emphatic statements that she was not going to stay "in such a place" we went ahead with our plans, putting in a few shrubs by way of encouragement, suggesting an arrangement for walks, and offering a few timely suggestions in general tidiness. To make a long story short, on our next visit to this place we found that the foreman's wife had not only taken the best of care of what we had planted, but had personally added to the collection of shrubs and flowers, and at this writing, eight years after this first interview, she is still there.

The Home Instinct

Home is uppermost in the mind of every normal man and woman. In this article—the fifth of the series of articles on Better Housing Facilities for Maintenance of Way Employees—H. W. Van Hovenberg describes the way in which the St. Louis Southwestern has appealed to this instinct to stimulate improvement of the houses provided for its section foremen, with such success that they have taken prizes in community contests while the migration of foremen has been greatly reduced.

Before and after at Garland City, Ark. Such unsightly wood piles and animal lots were not uncommon prior to this contest. The comparative view on the adjoining page shows what interest and a little effort can accomplish

Prior to starting the section house improvement campaign, section houses on the Cotton Belt, like those on many other railways, were considered merely shelters for the foremen and were constructed to a stereotyped plan with little thought of architectural design or setting. The company had never stimulated home-building among its section forces and consequently the foremen themselves had taken little or no interest in the appearance and upkeep of their property. As a result, there was a decided abuse of property; in some instances fences had been torn down to accommodate the wood pile; gates were found hanging on one hinge; broken

Homes Win Prizes

In Your Communities?

Cotton Belt has transformed company houses into attractive homes



The views at the left and above show what can be accomplished with the judicious use of shrubbery and vines

window-panes were stuffed with old rags; screens (tacked to the facings) were torn out to permit disposal of garbage; and clotheslines attached to the houses were pulling away the facings. In addition to the physical abuse of property, the unsightly appearance of woodpiles, washtubs and bed clothing on front porches, and an accumulation of tin cans and litter, added to the general untidy appearance of the property. Then, too, prior to this time there had been no instructions regarding the construction and location of garages, animal sheds, chicken houses, and woodsheds, and crude structures made of tin and other scrap material could be found at practically every section house on the system. The same held true of walks. Where there was a walk at all it was usually constructed of old bridge timbers, or ties. Temporary fences also were of the crudest and most unsightly type.

The Principles of the Campaign

To overcome these conditions and at the same time build up a morale among our section foremen which we felt would be reflected in their work, the section house improvement campaign was launched. The first year's work was more or less experimental and only 10 main line section houses were included. The work was handled as a contest and prizes were offered by the president to the winning foremen. A uniform system of scoring was used, a spring and fall inspection made, and awards based on the per cent of improvement. The results of the first year's work were so gratifying that the campaign was extended the following year to include the entire system.

Based on the experience gained in the field, a score card was devised which not only took into consideration the planting about the home, but the general tidiness and physical upkeep of the property as well, dividing the responsibility for physical upkeep between the company and the foreman. For instance, it is the company's responsibility to provide window and door screens for the section house, but the foreman is charged with the maintenance of the screens and penalized on the inspection score card for any abuse of them. The same is true of yard fences, window panes, chimneys, porches and porch steps. It is not expected that the company will send the house gang to make those minor repairs which are necessary from time to time. This score card eliminates the personal element in scoring and permits awarding the prizes on the basis of relative improvement during the year. The standard varies with the score of each section house. A man with a low score is required to make a greater number of points improvement to achieve 100 per cent than a man with a higher score.

To enlist the interest and co-operation of the roadmasters, the competition is conducted by roadmasters' districts and awards provided for the roadmaster who makes the greatest improvement on his district on the Arkansas and Missouri and the Texas divisions of the

railroad. An inspector from the sanitary engineering department handles the details of the contest with the roadmasters in addition to his regular duties on his territory. Since the award to the roadmaster is a trip to the Roadmasters' and Maintenance of Way convention, which is always held in September, the final score of section houses is made in August each year. To avoid any possibility of personal prejudice, two inspectors score every section house jointly. Thus, the two sanitary inspectors who have handled the details of the program on the Arkansas and Missouri lines score all the section houses on that division, and the two inspectors on the Texas lines score the entire Texas division jointly.

Prizes Were Offered to Stimulate Interest

To stimulate interest in the campaign and to arouse a little friendly rivalry between roadmasters and foremen, prizes as follows are offered by the president:

Roadmaster's Prize—Trip to the Roadmasters and Maintenance of Way convention.

System Cash Prizes—$30 in cash to the highest scoring section house on the system, and $15 in cash to the second highest scoring house.

Section Foremen's Prizes—A week's vacation with pay and foreign transportation, within reasonable limits, to the section foreman making the greatest judging per cent improvement in his score on each of the two divisions.

District Cash Prizes—$20 to the foreman making the greatest judging per cent improvement on each roadmaster's district, and $10 to the foreman making the second highest judging per cent improvement on each roadmaster's district.

Bunk House Prizes—A $15 first prize and $10 second prize to the foremen making the greatest and next greatest judging per cent improvement in bunk houses over the system.

Circulars are issued from time to time to aid the foremen in their work and detailed plans are drawn for the foremen to follow in order to eliminate haphazard planting. The first of these circulars dealt principally with general tidiness and the physical maintenance of property. Abuses we were desirous of stopping were the throwing of kitchen waste out of the back door, sometimes through the screens; the annual scalping of yards which resulted in bad drainage conditions under and around the house, and a better and less conspicuous arrangement of washing facilities, including the wash pot, clothesline and wash tubs. In this connection instructions were issued by the company, prohibiting the airing of bedding on front porches or front fences. The company further encourages the improvement work by distributing a limited amount of shrubs and fruit trees to foremen showing an active interest, and stresses the use of those shrubs from which cuttings can be made.

We have been very much gratified with the care given the shrubs and fruit trees provided by the company. In most cases the foremen have added to this collection until at the present time there are few section homes that do not have their own fruit supply. At one section home this year the foreman's wife canned 200 quarts of peaches, 40 quarts of plums, and 40 quarts each of peach and plum jelly from their orchard. Incidentally, the foreman planted potatoes and pole beans between the trees and harvested 10 bushels of potatoes and, in addition to the beans used on the table, his wife canned 22 quarts.

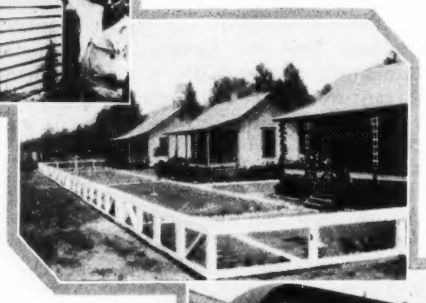
The Type of Planting Encouraged

In our planting we stress the importance of: (1) a smooth, well-sodded lawn as the first essential: (2) trees as the most important planting; (3) shrubs for permanent effect; and lastly (4) flowers and vines. In planting trees and shrubs we urge the foreman to use native stock as much as possible. We teach them that trees should frame the house rather than hide it and should be planted for both shade in summer and protection in winter. Most of our section homes are built on piling, which makes an unsightly open foundation. To overcome this barren appearance we ask our foremen to concentrate on foundation planting, using the taller growing shrubs in corners and in front of wide spaces between windows, and massing the lower growing shrubs under the windows and in front of the higher growing varieties. Many of the foremen have used hedge extensively for a foundation planting, securing cuttings from a generous neighbor and zig-zagging them 15 in. apart around the house. In front of the hedge they use the shrubs the company provides and the flowers and plants which they personally purchase. In the spring of 1929 six hundred shrubs were distributed to section foremen. All of this stock was surplus shrubbery accumulated in the company nursery.

Incidentally, the St. Louis Southwestern maintains a nursery in connection with its station and shop property improvement campaign, where lining-out stock and shrubs from cuttings are grown until they are of suffi-



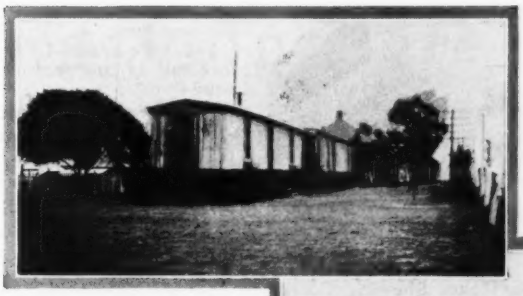
The screening specifications of the Cotton Belt provide for 16-mesh screen wire on full length frames which are hinged at the top and hooked at the bottom



The foreman frequently has bunk houses to beautify in addition to his own home. Note the trelisses and concrete walks above

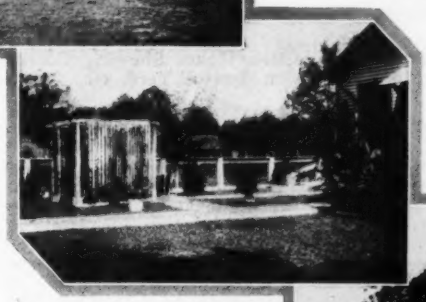


At the left — The gardening car which is used in promoting the work of beautification



The planting of hedge around the bunk houses hides the open foundation. Note how carefully it is trimmed

Below—A vine covered and neatly painted arbor over the well





At the right—Note how a vine covered trellis is used to screen the privy from view

cient size to transplant. This stock is moved over the road on a specially equipped gardening car. One end of this car is arranged for the storing and watering of the shrubs in transit, the middle compartment is equipped with a work bench, tool racks, roller, etc., and the remainder of the car is arranged for living quarters for the gradener foreman.

The kind of shrubs used depends upon the soil and climatic conditions. On the Texas Lines we have used some evergreen varieties, including abelia grandiflora, cherry laurel, waxleaf ligustrum and arbor vitae, with success, while on the Arkansas and Missouri lines the collection of shrubs has in a great part been limited to deciduous varieties, including weigelia, spireas, altheas, and barberry. The crepe myrtle and cape jasmine, belonging typically to the Southland, have found favor with our foremen, especially in Texas.

Flowers have their place in any scheme of beautification because of the small cost at which they can be planted and the mass of color they supply, but since it is permanent effect that we are after, we do not stress flowers other than to advise foremen where they should be planted. We recommend planting flowers in shrubbery beds, in front of shrubs, and in the flower garden. We not only discourage, but penalize the foremen for the promiscuous construction of flower beds in the center of the lawn, believing that the lawn should be kept clear and open.

A miniature section house lay-out, showing the proper location of (1) lawn, (2) garden, and (3) service yard, together with walks, drives, and plantings, was modeled and this served to tell the story to the foremen. Among other things we stress the fact that the lawn space should be at least five times the area of the house. The result has been that many foremen have at their own time and expense moved fences to increase the size of the yard and personally purchased lawn-mowers to care for the lawns—certainly a big step forward as compared with the scalped, barren area predominating before the section house improvement campaign was launched. We place gardens in the rear of the house and suggest the planting of hedge, vines, or flowers to screen them from the front lawns. We have found service yards a necessary evil and the manner in which our foremen have met the problem of hiding the wash pot, screening the wood pile, and building the clothesline, has not only evidenced their interest but shown keen originality.

Wanton Destruction Has Disappeared

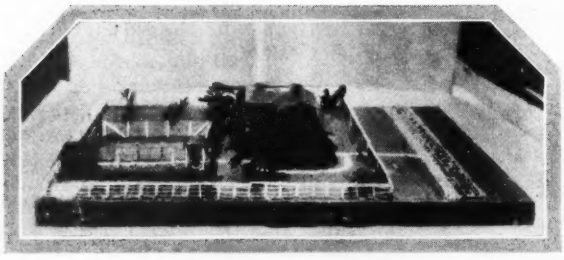
While the response from our foremen in this campaign has not been unanimous, the results as a whole have been most satisfactory, and the original aim of the company in promoting respect for company property has been in great part realized. We now rarely find any evidence of wanton destruction of property which is in itself a marked contrast to former years. The care given the full length window screens provided by the company after this campaign was inaugurated is particularly outstanding. We feel justified in providing full length screens, both because of making it possible to provide better ventilation by circulation of air through upper and lower window areas, and because the full length screen is proof against mosquitoes and flies, which is not true of the half-screened window if adequate ventilation is desired. Also the construction of out-buildings to conform to a standard and the building of permanent walks and drives has added materially to the appearance and property value of the section premises. A total of 4,263 ft. of concrete sidewalks has been built by section foremen on their own time.

The company, in keeping with its program of rehabilitation, has, whenever possible, provided city water, electric lights, gas, and modern plumbing. Screened-in porches are being provided, which add greatly to the comfort of the section house occupants.

The Results Are Evident

It is difficult to estimate the value of this campaign to the company, or to put a price on the enhanced property value by reason of landscaping. A quotation from one of our superintendents summarizes the feeling of the management with respect to this work:

"I have always been interested in this effort and have watched the matter rather closely and am positive that our expenditures and efforts are fully justified. Since inaugurating this work we have a number of section houses in the smaller towns that are without question the most desirable residences in those communities. Such conditions naturally attract and hold a desirable set of employees. For instance, I recall a few years ago that we had to change foremen at Bassetss on an average of every three or four months, while the present foreman has been there



Model of a Cotton Belt Section House Showing Correct Layout for the Garden Service Yard, etc.

four years and the section premises that formerly were simply a house and out-buildings that merely furnished protection from the weather are now a real home with nice lawn, flower garden, walkways, whitewashed fences, etc., and easily the nicest residence in the town. At the same time the seven miles of track under the supervision of this foreman has gone through the same transformation with an actual decrease in man-hours in labor employed. Duplications of this transformation can be found at Weaver, Clinton, Dunsmoor, Brownsboro, Chandler, Hubbard, Levita and many other points.

The formation of the habit of keeping neat and orderly living premises has resulted in neat and orderly track work in almost every case and is further reflected in the keeping of the foreman's time and material accounts—it

ST. LOUIS SOUTHWESTERN RAILWAY SECTION HOUSE IMPROVEMENT CAMPAIGN

STATION : NAME: DATE: INSPECTOR:

SCORE 1ST:	SCORE 2ND:	PHYSICAL (100)	REMARKS:
		Company's Responsibility:	
		A. Dwellings & Structures 20	
		I Repairs:	
		1 Siding	
		1 Chimney	
		1 Porch & Steps	
		1 Foundation	
		1 Roof	
		1 Privy	
		1 Yard Fences	
		1 Doors	
		3 Door Screens	
		1 Windows	
		3 Window Screens	
		2 General Repairs	
		II Paint:	
		1 Dwelling	
		1 Yard Fence	
		1 Privy	
		TOTAL COMPANY'S RESPONSIBILITY	
		Foreman's Responsibility 80	
		B. Dwellings & Structures	
		I Repairs:	
		2 Doors	
		4 Windows	
		8 Window Screens	
		8 Door Screens	
		4 Water Supply	
		7 Temporary Fence	
		8 Garage, Wood Shed, Chicken House	
		3 Gates	
		6 Walks	
		4 Drives	
		2 Gutters and Eaves	
		4 Yard Fences	
		II Paint	
		10 Temporary Fences	
		10 Garage, Wood Shed, Chicken House	
		TOTAL FOREMAN'S RESPONSIBILITY	
		BEAUTIFICATION 100	
		C. Walks & Drives	
		5 Not defined	
		5 Size & Arrangement	
		D. Lawns	
		10 Surface	
		10 Drainage	
		10 Sodding	
		10 Uncut Grass and Weeds	
		E. Planting	
		10 Trees	
		10 Shrubbery	
		5 Vines & Trellises	
		5 Flowers	
		F. Tidiness	
		20 General Tidiness	
		TOTAL BEAUTIFICATION	
		G. Additional Merits or Demerits	
		GRAND TOTAL SCORE	

Score Card Used in Making the Improvement Inspection

frequently being the case that the division accounting force does not have to change a single item in the foreman's books from an entire roadmaster's district.

If this campaign were discontinued I am positive that our expenditures for roadway buildings would immediately show a considerable increase, and that we would revert to the old conditions where all maintenance, including minor repairs, was done by the bridge and building forces at greatly increased cost. At present practically all minor repairs, such as screening, repairing fences, etc., is done by the foreman, largely after his assigned hours and on his own time.

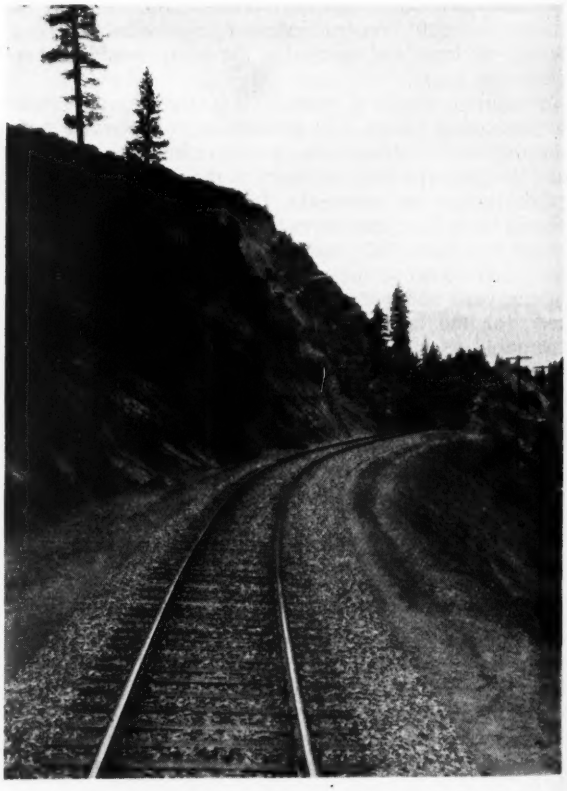
We have reached the point where a change in section foremen is an unusual occurrence, which is a healthy condition."

Another of our superintendents states:

"There is a rule about foremen that very seldom fails, that is the quality of a section foreman can be judged eight times out of ten by the manner in which he maintains his tools, tool house, and premises. If he maintains his tool house and premises in a neat and orderly manner you can figure that he is a good man. While if he keeps his premises in a sloppy condition he is usually a foreman who performs sloppy work.

In my opinion the maintenance of every section dwelling headquarters has been reduced $40 per year, traceable directly to the section house improvement campaign. Undoubtedly this campaign has been one of the factors keeping a better class of foremen because it is one of the factors that tend to keep our foremen satisfied with their work and homes."

The Cotton Belt has enjoyed much favorable publicity from the campaign, some of the section homes having carried off state and local honors in the "Better Homes" movement sponsored by federal and state agencies. The friendly rivalry between foremen has brought them closer together and instilled in them a pride of home and a feeling of stability that we feel is worth many times that it costs the company to carry on this campaign. While the work is still handled as a competition, the satisfaction and pleasure that the foremen and their families have found in an attractive home is of greater significance to them than a prize. One foreman's wife very ably expressed the feeling prevailing among most of the section people when she said, "Of course, I enjoy being a winner, but the pleasure I get out of an attractive home is worth more to me than a prize. Why, even folks from over town drive down to see it."

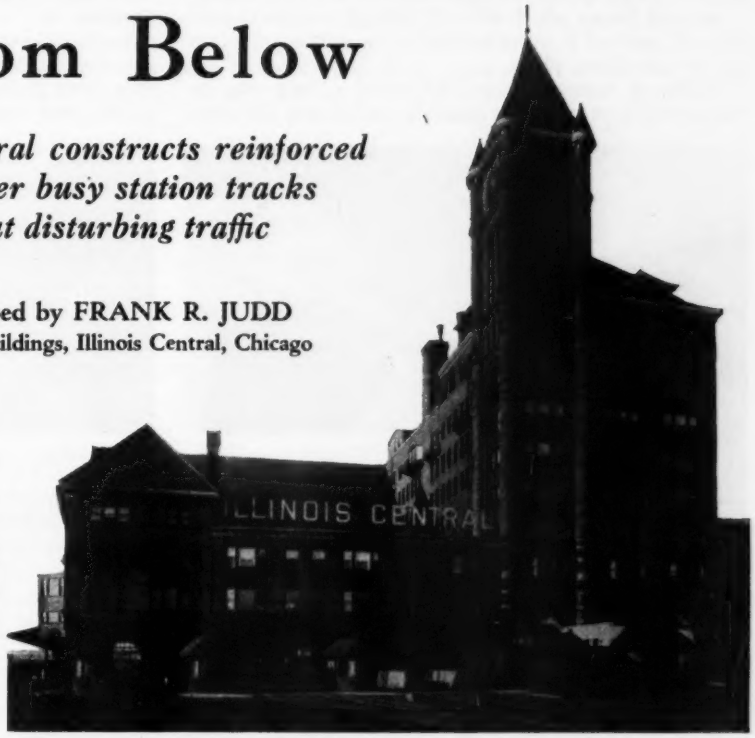


In the Feather River Canyon on the Western Pacific

Building Concrete Slabs from Below

Illinois Central constructs reinforced beams over busy station tracks without disturbing traffic

As Described by FRANK R. JUDD
Engineer of Buildings, Illinois Central, Chicago



Central Station Headhouse Spans Seven Tracks

THE Illinois Central has recently completed extensive repairs, which included the construction of reinforced concrete slabs from below, to the headhouse at its Chicago station, doing the work over passenger platforms and station tracks that were in almost constant use, where the clearance above the rail is only 17 ft., and where the working space was badly cramped in other respects, without disturbing traffic or interfering with the use of the general waiting room which is immediately above.

The character of the repairs that were made were dictated by the type of construction, which was based on the materials available at the time the building was completed nearly 40 years ago, while the methods that were employed in doing the work were influenced by the fact that practically all trains entering or leaving the station must pass directly under the headhouse. The work in question consisted of removing the ceiling of the headhouse; cleaning and reinforcing the structural members which support the general waiting room above; the construction of reinforced concrete slabs to replace the disintegrated and broken tile arches which had directly supported the floor of the waiting room; and the encasement of the exposed girders and beams.

Clearance Is Limited

The Chicago or Central station of this road was completed April 17, 1893. The station tracks, which extend from the trainshed immediately to the south, run beneath the main waiting room, which is supported by cast-iron columns, box girders and 15-in. I-beams spaced on 15-ft. centers, and extends over seven tracks. Owing to the restricted overhead clearance, the ceiling of this part of the structure is subjected to the intensive action of locomotive gases and is exposed to the destructive effect of the blast from the locomotives, which strikes the ceiling with great violence at a distance of only a few inches above the top of the stacks.

Flat tile arches span the space between the 15-in. I-beams, acting as a support for the cinder concrete base upon which mosaic flooring is laid. The under side of this construction was covered by a suspended ceiling, consisting of clay book tile, supported by T-irons spaced 25 in. on centers. The T-irons were suspended by means of hangers, which were clamped to the lower flange of the 15-in. I-beams and spaced at 10-ft. intervals longitudinally and 50 in. transversely.

When the building was completed, the whole underside of this ceiling was plastered. Owing to the moisture and sulphurous acids in the locomotive gases, and the blast from the locomotive stacks, the plaster kept falling off and exposing the tile surface beneath. As a result, the whole of this tile surface was covered with transite about 1906.

Results Were Not Satisfactory

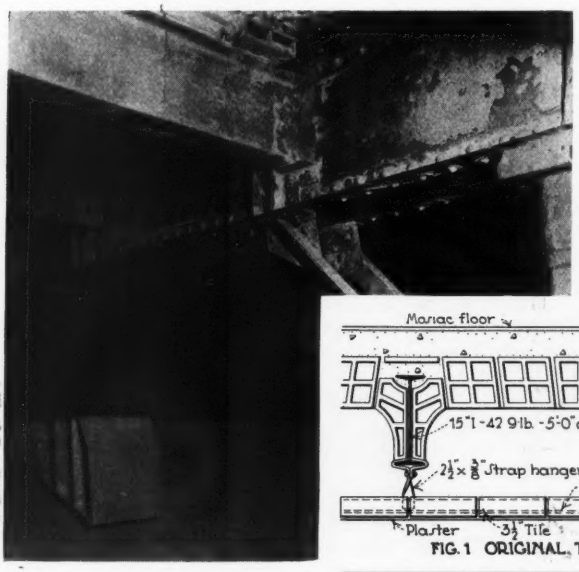
Since the clear height of the ceiling over the tracks was only 17 ft., the same difficulty was experienced with the transite. The engine blasts, coupled with moisture and sulphurous gases, destroyed this ceiling over large areas, this action being particularly severe directly over the tracks. Even where the transite itself did not fail, the toggle bolts which were used to suspend it were eaten away in a short time by corrosion, although they were made of an alloy that has a high resistance to corrosive gases.

The destruction of the protective coating exposed the tile to the same action, and it was soon worn away and disintegrated by the force of the engine blast. This brought the engine blast into direct contact with the lower flanges of the I-beams, so that active corrosion was started in them, in addition to which a measurable amount of attrition occurred in the metal.

When the flat ceiling tile disintegrated, a wood ceiling was constructed over the damaged areas. This consisted of 1-in. sheeting, nailed to 2-in. by 4-in. strips which were laid flat and parallel to the I-beams on a spacing of 3 ft. These nailing strips were supported by frames, spaced 3 ft. apart, which spanned the interval

between the I-beams. In order to allow the frames to be hooked over the lower flanges of the I-beams, it was necessary to knock out the haunch tile at these points. This exposed an added area of the steel beams to the acid fumes which filtered through the wood ceiling, and resulted in an extension of the corrosive action which was taking place.

While, in some respects, the wood ceiling was an improvement over the previous devices, it was far from satisfactory, since large areas collapsed from time to time, owing to the rusting of the nails and other fastenings, and in places it too was destroyed by the engine blast. This damage was accelerated by the load of arch floor tile which disintegrated and fell from above and by a considerable accumulation of soot and screenings from the locomotives. As the wood ceiling collapsed it was not replaced.



The view above shows the waiting room floor framing after the wood protection shown in Fig. 2 had been removed. The steel was thoroughly cleaned before the new protection and reinforcement were applied.

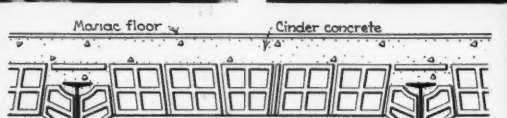


FIG. 1 ORIGINAL TILE CEILING.

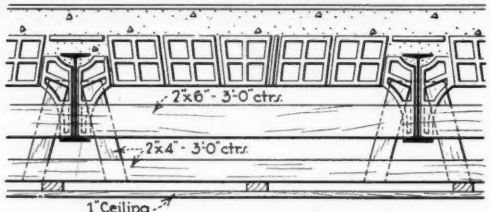


FIG. 2 WOODEN CEILING WHICH REPLACED TILE CEILING.

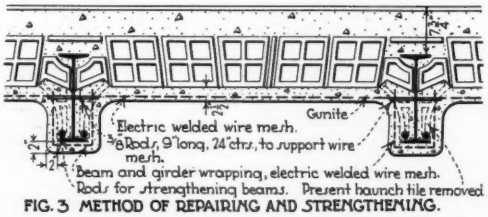
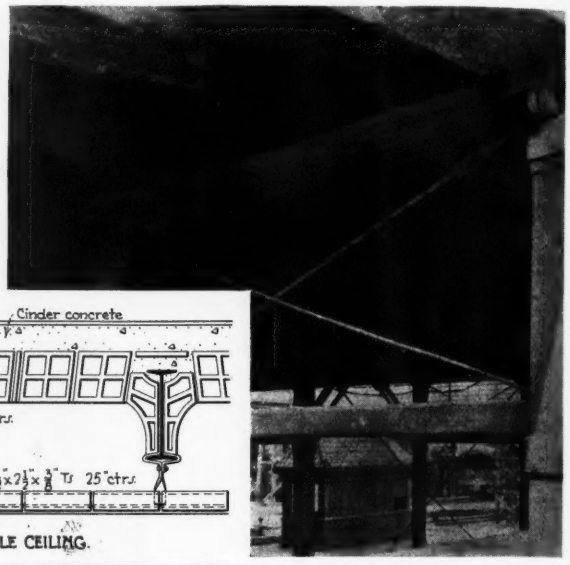


FIG. 3 METHOD OF REPAIRING AND STRENGTHENING.



The view above shows the new protection and reinforcement in place. The details of this are shown in Fig. 3. The line drawing in the center gives a progressive history of the floor protection, beginning with the original construction

Condition Becomes Serious

A detailed examination of the floor and structural members revealed a serious condition that called for immediate action. The corrosion of the metal was advanced far more than had been expected, and the spalling of the arch tile had left the floor with little or no support over considerable areas. In many places the I-beams had lost from 15 to 26 per cent of their original cross section, and the girders from 10 to 25 per cent. Many of the lower cover plates of the box girders had wasted away entirely. The floor tile arches were cracked and broken and, in some cases, whole panels had dropped out, exposing the under side of the cinder concrete fill.

In its weakened condition, and on the basis of allowable unit stresses, the floor was found to be good for only from 20 to 50-lb. of superimposed load, in addition to the dead weight of the structure. Most of this deficiency in strength was in the beams and tile arches, the girders having been designed for very low unit stresses, so that even in their corroded condition they had sufficient strength, in most cases, to sustain a superimposed load of more than 100 lb. per square foot.

Temporary shoring was placed under the weakest sections of the floor in the latter part of 1926, immediately after the conditions were discovered, pending more permanent and substantial repairs. Since Central station is a busy terminal, it was necessary that the repairs be made under traffic, without interfering with the use of the tracks below or the waiting room above. The problem, then, narrowed down to that of developing some means of strengthening the structural members of the floor and protecting them in such a way that further deterioration would be prevented, without disturbing the cinder concrete or the mosaic floor surface.

The studies indicated that the most effective method

of accomplishing the desired results would be to encase the lower flanges of the girders and beams with concrete, which had been reinforced with rods to make up for the deficiency of section caused by corrosion. The construction of reinforced concrete slabs to replace or support the missing or weakened tile arches then became the most logical method of caring for this condition. It was clearly evident that the only possible method of placing the concrete without disturbing the waiting room floor was from below, by means of the cement gun, and this method was adopted.

The method of constructing the concrete gunite slab and beam encasement at those points where the existing floor tile was left in place, is shown in Fig. 3. This section was used under most of the floor, as there were comparatively few places where the arch tile had dropped out completely, or was in such condition that it had to be removed. In these areas the gunite floor slab extended up to and against the cinder concrete and here a greater part of the steel beams were encased.

As the work progressed, all temporary shoring and existing ceiling were removed, both wood and the small amount of book tile which remained in several places remote from the tracks. The loose floor tile was removed and all surfaces were first cleaned roughly and then thoroughly by sand-blasting. The reinforcing for the slab and beams was then placed and the gunite shot on in layers not exceeding ¾ in. in thickness.

The slab reinforcing was placed to receive a protection coating of not less than one inch of gunite, which was composed of one part of Portland cement and three parts of sand which had passed a quarter-inch sieve. It was placed with a gun pressure of not less than 35 lb. per square inch.

After the placing of the gunite was completed over any section, the surface was kept damp by drenching with a hose for one week. Directly over the tracks, temporary shields, made of light steel sheets nailed to a light frame, protected the fresh gunite.

Temporary wood canopies, which were designed for use also as construction platforms, were erected between the tracks and over passenger walkways, to protect the public. Very light movable scaffolding, mounted on the wheels of an ordinary push car, was used to reach the areas over the tracks, platforms and passenger runways.

The sections of the waiting room under which the work was being done at any time, were roped off or temporary flooring was laid to span from steel beam to steel beam. In this way, all danger of local collapse of the cinder concrete was eliminated in places where the floor tile had been removed. The floor as finally strengthened is good for a superimposed load greater than 100 lb. per square foot.

The work was started in the latter part of June, 1928, and finished early in October of the same year, consuming about 3½ months. While this may seem a long time for a job of this magnitude, it must be remembered that much of the work was done at night, owing to the frequent train and engine movements over the tracks during the day time, and that even during the night, interruptions were quite frequent. Furthermore, the congested condition of the site necessitated doing the entire job from one plant set-up. This in turn required the use of a maximum hose length of 300 ft. to reach the extreme limits of the work.

The plant consisted of one 15-in. by 10-in. belt-driven Chicago Pneumatic Tool Company air compressor, mounted on a steel chassis, and driven by a 75-hp. electric motor; one N2 cement gun for placing the gunite; one air dryer; one Kent continuous mixer; one belt elevator, for raising the mixed concrete to the hopper which fed the cement gun; and one N1 cement gun for cleaning and sand-blasting the old work.

The preliminary investigation was made, the plans and specifications prepared and the work executed by the engineering department of the railway under the direction of A. F. Blaess, chief engineer. The general contract for the work was awarded to Jos. E. Nelson & Sons of Chicago, while the placing of the gunite was accomplished by the Cement-Gun Construction Company, also of Chicago.

Although the work has been completed for almost a year, it is considered that the time has been too short to draw final conclusions as to what the ultimate result from this form of protection will be. Close observation has failed, however, to detect any signs of deterioration of the materials or structural weakness in any part of the floor or its support.



A Part of the Loop on the West Slope of the Bitter Root Mountains on the Chicago, Milwaukee, St. Paul & Pacific Line in Idaho

How One Road Reduced I

By E. W. BOOTS
Engineer, Maintenance of Way, Pittsburgh & Lake Erie, Pittsburgh, Pa.

THE Pittsburgh & Lake Erie extends through the intensely industrial sections of southwestern Pennsylvania and west-central Ohio, connecting the coal fields and their coke works with the manufacturing plants in the valleys of the Youghiogheny, the Monongahela, the Ohio, the Beaver, the Shenango and the Mahoning rivers, the densest industrial sections of the United States. The total length of the P. & L. E. is 231 miles, of which 54 miles have four main tracks, 117 miles have two main tracks, and 60 miles have only a single main track. All of the last mentioned mileage is on branches.

The traffic density on this road is greater by far than any other railroad in the United States. This density is equal to 49,367 gross ton miles per mile of road each day. The four roads having the nearest approach to this traffic density had only 43,161, 41,916, 38,857, and 35,791 gross ton miles of road each day, respectively in the first nine months of 1928.

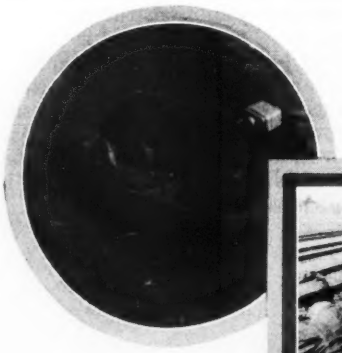
Safety Work Is Carefully Organized

Owing to its location in an intensely industrial section, where there is opportunity for men to find employment easily, the turnover of labor on the P. & L. E. is large. The average number of employees in the maintenance of way department for the year 1928 was 2,200. Nearly all of the reportable accidents that have occurred in the maintenance of day department on this road should not have occurred, and investigations of these accidents have shown that they were caused nearly wholly by carelessness and by failure to heed instructions.

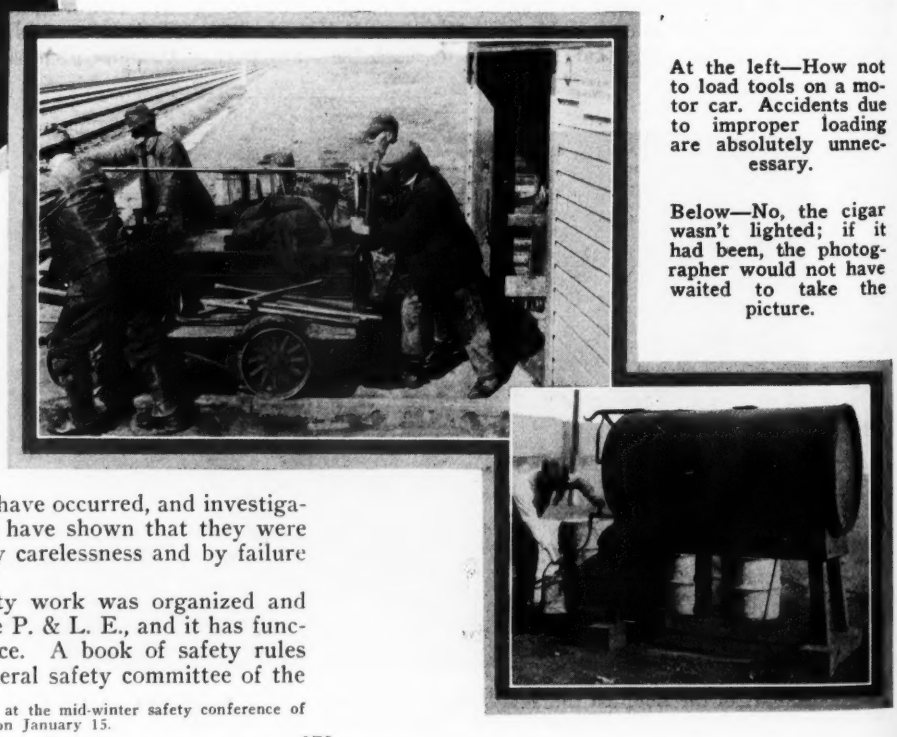
In March, 1912, safety work was organized and began to function on the P. & L. E., and it has functioned continuously since. A book of safety rules was adopted by the general safety committee of the road and a copy of this book was given to every employee, with the exception of laborers who could not read English. These rules include what before had been largely verbal instructions. Each employee was urged to keep this book and to familiarize himself thoroughly with the rules.

The safety organization of the P. & L. E. is composed of the general safety committee and six local safety committees reporting to the general committee. The railroad is divided into six parts, in each of which there is one local safety committee. The maintenance of way department is represented by 15 of its employees on these 7 committees.

All employees of the maintenance of way department are urged to be safety workers and thereby help to reduce the number of accidents. Safety is recognized as being a necessary part of all work. Supervisors of track, bridges and buildings and of water supply, and other supervisory officers are called into meetings in which causes of accidents which occur are discussed. Those officers hold meetings with their assistants and with their foremen and discuss with them the causes of these accidents. The foremen, in turn, discuss the causes of accidents with their men. Every reportable accident which occurs in the maintenance of way department is thoroughly



Above—The draw bar should have been picked up at once, but it wasn't, and a badly bruised leg was the result.



At the left—How not to load tools on a motor car. Accidents due to improper loading are absolutely unnecessary.

Below—No, the cigar wasn't lighted; if it had been, the photographer would not have waited to take the picture.

*Abstract of a paper presented at the mid-winter safety conference of Eastern railroads at New York, on January 15.

Its M. of W. Accidents

P. & L. E. makes outstanding safety record in spite of serious difficulties presented by dense traffic and heavy turnover of labor*

investigated and the cause determined, and all supervisory officers are informed of the findings. In cases of preventable accidents, after investigation, discipline is applied by reprimand, suspension or dismissal. In cases of unpreventable accidents, after investigation, instructions are given tending toward the prevention of the repetition of such accidents. These practices resulted in gradually reducing the number of accidents each succeeding year until the end of 1923, when it was thought that safety work had reduced accidents to a minimum. The casualty ratio per million man-hours for that year was 24.85.

Five Accidents That Were Preventable

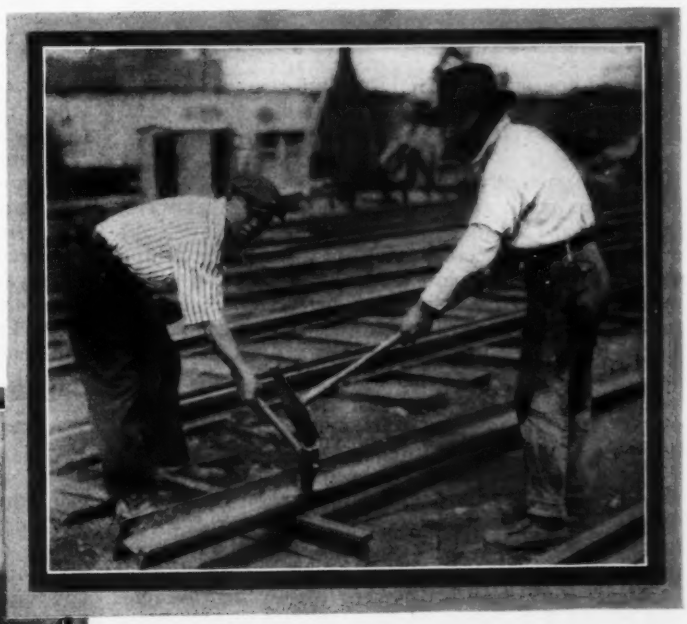
During the years from 1924 to 1928, inclusive, a more intensive effort was made in accident prevention work with good result each year. This is shown by the following table:

Year	Killed	Injured	Ratio-per 1,000,000 man-hours
1924	2	46	16.34
1925	1	47	13.42
1926	2	18	5.41
1927	2	6	2.15
1928	0	5	0.89

The five accidents of 1928 were wholly preventable, and, therefore, our casualty ratio should have been zero. Three of the accidents occurred under the jurisdiction of one supervisor and the other two occurred under the jurisdiction of two other supervisors. Five supervisors had no accidents among their men.

In the first of the five accidents, a foreman with a gang of laborers was unloading a stockrail from a push car. The foreman failed to station himself where he could see the position of all of the laborers, one of whom had one foot too far advanced. As a result, the stockrail struck his foot and broke two bones. In the second accident of the year, a foreman with a worktrain gang of laborers was unloading crossties from a gondola car. The foreman failed to be where he could see the position of all of the laborers. One of the laborers placed his tie tongs on a tie in a wrong manner, and as a result, the tongs slipped and struck his shin, breaking a small bone just above the ankle.

In the third of the five accidents during the year, a foreman was moving his extra gang on two hand cars, and violated one of the rules for the operator of such cars by placing a drum of gasoline on one of the cars. When the hand car was started, after a necessary stop, one of the laborers attempted to





Perhaps it is pay day. At any rate, the men seen above do not have their minds on the job. No goggles, a spike maul instead of a sledge hammer, and a track chisel with a badly mashed head form a combination that invites disaster.

At the left—The haphazard disposal of tools on the job is poor practice.

board the hand car carrying the drum of gasoline, by taking hold of the top of the drum from the side of the car instead of from the rear end of the car. His foot did not clear the rail and was squeezed and bruised. The fourth accident occurred when a foreman with a section gang of laborers was resetting a guard rail of a frog at quitting time for the day. He told the laborers, except one, to gather up the tools and to put the hand car on the track, and he told the one laborer to strike with a spike maul the spike maul which he himself was holding, and using as a follower on top of a spike being driven between the running rail and the guard rail. All foremen have track punches that are for use as followers. This foreman had track punches on his hand car, but instead of using one of them he carelessly used a spike maul as a follower. The two spike mauls are made of special high tempered steel, and as a result of the impact between them, a ship flew off from one of the mauls and entered the thigh of the foreman, puncturing the femoral artery. This resulted in the amputation of his leg, and later, in his death.

In the fifth accident on the P. & L. E. during 1928, an assistant supervisor of track, with 39 years continuous track experience on this road, was walking westward against the current of traffic on No. 1 main track, and seeing a freight train approaching eastward on No. 2 main track, he stepped off No. 1 main track into the "six foot" between No. 1 main track and No. 1 yard track. Continuing to walk eastward he failed to hear or see a draft of freight cars being pushed westward on No. 1 yard track. He was knocked down by the lead car of this draft of cars and his right leg was run over, necessitating its being amputated below the knee.

These five accidents have been described to show their causes, and to prove that they were wholly preventable. Of the 48 accidents of the year 1924, 33 were wholly preventable. Of the 48 accidents during 1925, 36 were wholly preventable. Of the 20 accidents during 1926, 15 were wholly preventable, and of the 8 accidents during 1927, 4 were wholly preventable. A record of some of the more common preventable accidents which occurred on the P. & L. E. during the years 1924 to 1927 inclusive, is given in the following:

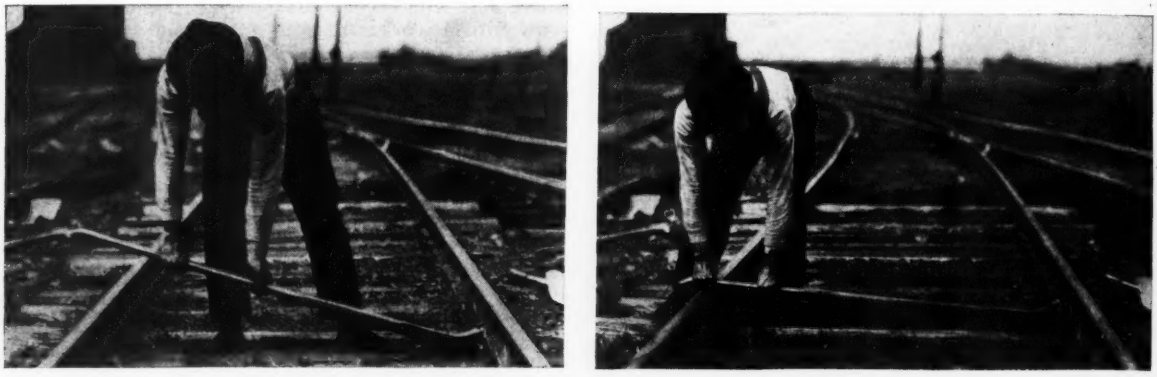
Track Forces Have Unnecessary Accidents

A foreman, in attempting to remove a track jack from under the rail, allowed himself insufficient time and he was struck by an approaching motor car and had his leg broken. He acknowledged his fault and was allowed to return to work with a reprimand.

A foreman left his gang of men and went about one-half mile eastward along the railroad to converse with another foreman at that point. A worktrain came out of a siding on to the main track at this point and the foreman attempted to get on the locomotive of the worktrain. In doing so he slipped and fell and had one foot mangled, which resulted in amputation above the ankle. This foreman was reprimanded but was allowed to return to work in a position where he is not required to be standing much of his working time.

A section foreman who was called at night to repair a switch in an improved city street, failed to take a red light with him for protection. He was run down by an automobile and badly bruised about his body. He acknowledged his fault and was suspended.

A section foreman was changing the low rail on the inside of a curve. When he was ready to throw the rail out he placed himself in a position where the rail struck him when it jumped and he had two toes of one foot broken. He acknowledged his fault and was suspended.



The Right Way and the Wrong Way to Hold a Claw Bar

A laborer was removing snow from a track at a locomotive terminal. A freight locomotive leaving the terminal with a large amount of steam escaping obscured his vision and he did not hear the approach of a yard engine. He was knocked off the track by the yard engine but was not severely injured. He acknowledged his fault and was reprimanded, and then allowed to return to work.

B. & B. Men Also Have Preventable Accidents

A carpenter foreman attempted to move a scaffold along the side of a building with the help of three men. The work required the help of four men, and even though the carpenter foreman had other men working on this building, he did not call for the fourth man. In moving the scaffold, a plank of the floor of the scaffold fell and struck one of the men and injured his ankle. The carpenter foreman acknowledged his fault and was reprimanded.

A carpenter, with the assistance of another carpenter, was placing awnings on a building. He had two ladders of different lengths suitable for placing different awnings. He placed the longer ladder on a flat slope but was cautioned by his assistant that the ladder would probably slip. The carpenter paid no attention to the caution given him and mounted the ladder. The ladder slipped and the carpenter was injured. He was dismissed.

A painter was observed to be careless when work-

ing on scaffolds. He was cautioned about being careful, but finally fell off a scaffold. He was dismissed. Both of these latter accidents were investigated and the causes of them made known to all foremen and other employees. As a result, we have not had a similar accident since.

A pumper used gasoline in a kerosene torch to thaw a frozen water pipe. The torch was constructed for burning kerosene and not gasoline. An explosion occurred and the pumper was severely burned on both legs.

A pumper dropped his keys in a pipe pit under a water softener tank. He went into the pit and lit a match in order to find the keys. The pit contained some natural gas which had leaked into it from a nearby gas main of a gas company. An explosion occurred and he was burned on both hands and face.

A motor car repairman, in testing a repaired speeder, put it on the main track immediately behind a fast passenger train and made passenger train speed for 25 miles, passing through 44 switches. On the forty-fifth switch the speeder derailed and the motor car repairman had his left arm broken.

Hernia Cases Should Be Investigated

By a close study of accidents where hernia or alleged hernia is given as the result of accidents, we have found that it is highly important that these cases have immediate investigation. A laborer presented himself to one of our company surgeons and alleged that he had received a hernia that day. The surgeon examined him and found that he had a hernia and immediately operated for the hernia. It developed that this laborer had the hernia for several months and had not received it on this railroad.

There have been four other cases where employees have alleged that they received injuries which caused hernias, but immediate investigation developed that these four employees had had hernias for a considerable time, and therefore, they were not accepted as accidents. There have been six other cases of alleged hernias received from accidents while on duty, but immediate investigations developed that the six men involved were suffering from scrotal and inguinal inflammations from acquired specific infections. These six cases were not accepted as accidents.

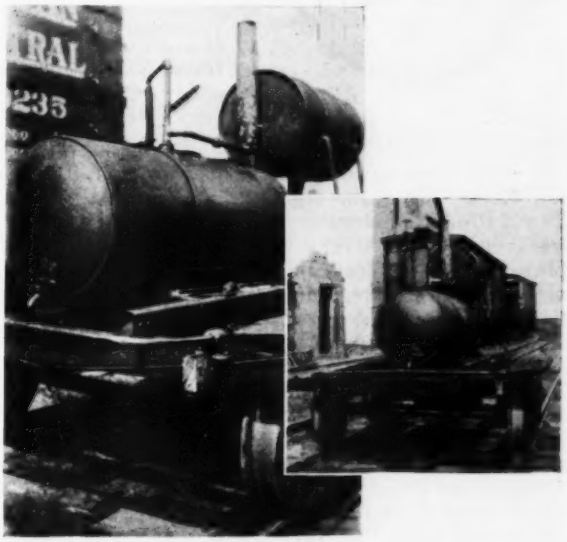
Many times in the last four years the statement has been made that the casualty ratio in the maintenance of way department of this road is low because of the fact that a large number of the laborers are not the employees of the railroad, but rather the employees of contractors, and that accidents to these laborers are not accounted for in the accidents of the railroad. A large number of the laborers were, prior to March 1, 1928, the employees of contractors, and accidents to these laborers were not accounted for in the accidents of the railroad. Likewise, however, the man-hours of these laborers were not accounted for in the accidents of the railroad.

Since March 1, 1928, these same laborers have been the employees of this railroad and all accidents to them, and all of their man-hours have been accounted for in the figures for the road. The descending casualty ratio for the years 1923 to 1928, inclusive, shows that the lowest ratio is for the year 1928, 0.89 per million man-hours. This proves that the statements referred to were incorrect. The matter of accident causes and remedies lies almost entirely with the supervisory employees, who, by a thorough, constant and systematic supervision can reduce accidents.

Heating Creosote for Adzed Ties

WHILE the importance of applying hot creosote to the freshly-adzed surfaces of treated ties in track is well understood, this work usually entails considerable trouble where the requirements are extensive, as on rail-relaying jobs. Aside from the difficulty of heating the creosote at a point convenient for application, it has also been hard to keep it hot enough to secure the desired penetration into the wood, resulting in delays to the work of the gang as well as inadequate protection for the ties.

To obviate these objections by providing a portable heater which can be kept close to the work, J. E. Emond, roadmaster on the Atchison, Topeka & Santa Fe at Kingman, Kas., has devised a heater outfit mounted on a push-car, as shown in the accompanying illustration. The heater tank is of ½-in. iron and has a capacity of 60 gal., while the reserve tank, with a capacity of 30 gal., is so placed that the



The Heater Ready for Service

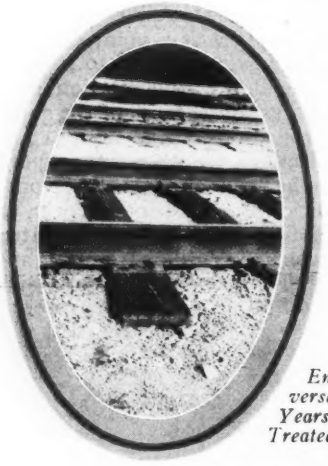
cold creosote is carried into the heater tank by gravity, through a connecting pipe equipped with a valve. A fire-box of light material is built under the heater and wood is used for fuel, one man being detailed to keep up the fire and to see that the heater tank is kept filled. In case the creosote becomes too hot, the admission of cold creosote from the reserve tank cools it below the danger point.

In beginning the day's work, it requires about 30 minutes to heat the creosote to the desired temperature, so that by the time the work of the gang is well under way, the creosote is ready. As a pail of creosote is drawn from the heater, a like amount is added from the reserve tank so that there is a constant supply of hot oil.

Mr. Emond, who conceived the idea of the device and to whom we are indebted for the foregoing information, assembled the tanks and appurtenances wholly from discarded materials. He advises that by the use of this heater, he has saved the labor of three men daily and has been able to apply the creosote with better results than by any method he had used or seen previously.

Roads Report Tie Records

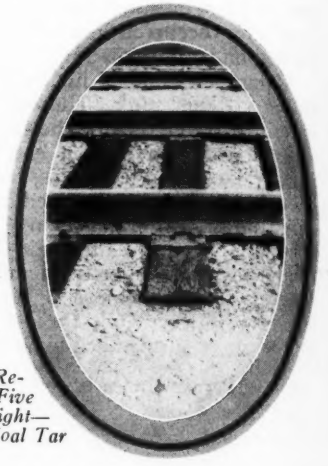
of Rocky Mountain Timbers



Forest Products Laboratory summarizes results of studies to determine relative merits of various woods

As Reported by R. M. WIRKA

Associate Engineer, Forest Products Laboratory, U. S. Department of Agriculture, Madison, Wis.



Englemann Spruce and White Fir Ties in the Hammett-Reverse Test Track of the Oregon Short Line, After Nearly Five Years Service. Left—Treated With Straight Zinc Chloride. Right—Treated With a Mixture of 30 Percent Creosote, 7½ Percent Coal Tar and 62½ Percent Fuel Oil.

TO DETERMINE the serviceability of railway ties made from species of wood that are native to the Rocky Mountain region, representatives of the Forest Products Laboratory have recently inspected test tracks installed on several western roads and have supplemented the information so gathered by data furnished by railways regarding other test sections of such ties. The roads whose test sections are included in the survey are the Denver & Rio Grande Western, the Nevada Central, the Northern Pacific, the Oregon Short Line, the Atchison, Topeka & Santa Fe, and the Union Pacific.

Between 1923 and 1927 the Oregon Short Line established four test tracks in Southern Idaho; between Orchard and Boise, between Hammett and Reverse, between Dietrich and Shoshone, and between Rogerson, Idaho, and Wells, Nevada. These four tracks contain about 82,500 ties of Douglas fir, lodgepole pine, western yellow pine, Engelmann spruce, white fir, and western larch. The ties are treated with straight creosote, mixtures of creosote with fuel oil and coal tar, straight zinc chloride, and zinc chloride followed with fuel oil (two movement). The tracks in which these ties are set run over fills and through cuts in dry sagebrush regions.

The Union Pacific Made One Installation

The Union Pacific, co-operating with the Forest Service, established a test section in its main line at Laramie, Wyoming, in October, 1927, which contains 100 Engelmann spruce and 400 lodgepole pine ties. Of the latter, 100 each contained stump rot and red rot, 100 were made from sound dead trees, and 100 from live trees. Both the Engelmann spruce and lodgepole pine ties were treated with zinc chloride. All of the ties were found to be in good condition when inspected in the fall of 1928.

In 1927 the Denver & Rio Grande Western established a test track containing ties of Rocky Mountain species in each of the following divisions: Pueblo, Salida, Alamosa, Grand Junction, and Salt Lake. One hundred ties each of Douglas fir (mountain type), western yellow pine, Engelmann spruce, and lodgepole pine were set in the five divisions, making a total of 2,000 ties in the test. The ties were set in standard gage main tracks. All ties were treated with a 45-55 mixture of petroleum and creosote and were reported by the officers of the railroad to be in good condition after about one year's service.

The Atchison, Topeka & Santa Fe established a test section in 1923, in its main line near Lucy, New Mexico, containing 300 cottonwood ties, both sawed and hewed, of which 150 were treated with 5 lb. per cu. ft. of straight creosote and 150 with 7 lb. per cu. ft of a 50-50 mixture of creosote and petroleum. At an inspection made in 1928 the ties were found to be in good condition, showing no decay, a little checking, and slight plate wear.

A thorough examination was also made of some cork-bark fir ties in the main line near Mountainaire, New Mexico. These ties, which had been treated with a 45-55 mixture of creosote and petroleum, were not in a test section but had been inserted in 1925 in the regular maintenance of that section of track. The ties were in poor condition, showing considerably more plate wear than the western yellow pine and other species used with them.

Records are being kept by the Forest Service on 300 untreated pinon pine ties inserted in 1925 between Austin and Battle Mountain, Nevada, in narrow gage tracks of the Nevada Central. At an inspection in 1928, after about 3 years' service, most of the ties were found to be in good condition.

Six Northern Pacific Test Installations

Inspections were made or information obtained on six test tracks on the Northern Pacific, located at Plains, Thompson Falls, Missoula, Paradise, and Lo Lo, Mont., and Marshall Junction, Wash. The Plains test track, established in 1907 in co-operation with the Forest Service, originally contained 2,650 green and seasoned untreated and seasoned zinc-treated ties of Douglas fir (mountain type) and western larch. The untreated ties have long since been removed, the average life for

the green and seasoned western larch being 7.3 and 7.4 years, respectively, and for the green and seasoned Douglas fir, 7.6 and 7.7 years, respectively. All of the ties remaining in the track have been turned over on account of plate cutting; the joint ties and a few others were turned in 1914, and the remainder in 1918 and 1920. The ties still in the track at the 1928 inspection, after about 22 years' service, were in poor condition from decay and checking and will probably be removed within a year or two.

The Thompson Falls test track was established in 1915 in co-operation with the Forest Service. It originally included 1,575 creosoted ties of Douglas fir (mountain type), western larch, lodgepole pine, western yellow pine, and white fir and 100 untreated ties, 50 each of western larch and Douglas fir (mountain type). The untreated ties have been removed, the larch giving an average life of 7 years and the Douglas fir 7.5 years. When the test was established, part of the ties were equipped with Vignoles rail chairs and part with Northern Pacific standard plates. In 1925 the track was relaid with heavier rail, at which time all of the old plates were replaced with large Northern Pacific standard tie plates. It was impractical to remove the Vignoles rail chairs from 65 good ties so that it was necessary to remove these ties from the track, although they were still in good condition. Six creosoted ties equipped with Vignoles rail chairs were also removed in 1923 for an examination of the chairs. Up to the fall of 1928, the time of the last inspection, a total of 189 ties had been removed from the track; 100 untreated ties on account of decay, 18 creosoted ties on account of mechanical wear, mostly joint ties, and 71 creosoted ties with the Vignoles plates. It is interesting to note that after about 13 years none of the creosoted ties have been removed on account of decay.

The Paradise test track was established in 1921, in the main track near the Northern Pacific treating plant at Paradise. It contains 342 ties, including western yellow pine, Douglas fir (coast and mountain type), western hemlock, cottonwood, and western larch, treated with a 50-50 mixture of creosote and California oil, and creosoted Douglas fir (coast type). With the exception of the last group, one-half of the ties of each species were incised by hand before treatment. At the 1928 inspection the ties were in good condition although a few were checked and split somewhat. No difference was observed at that time in the condition of the incised and the non-incised ties.

The Missoula test track, which was established early in 1910 in the main line near Missoula, is reported to contain 1,800 hewed and sawed ties, probably about 50 per cent made of western hemlock, treated with an 80-20 mixture of creosote and California oil. The records furnished by the railroad show that only 49 ties of the 1,800 have been removed after 18 years' service, which indicates that treated western hemlock gives very good service.

The Lo Lo, Mont., and Marshall Junction, Wash., test tracks, containing sawed cottonwood ties treated with 8.6 lb. of creosote per cubic foot, were established in 1910. At the end of about 18 years' service 3, or about 1 per cent, of the 261 ties in the Lo Lo test, and 60 or about 11 per cent, of the 554 ties in the Marshall Junction test, were removed. All removals have been made on account of excessive plate cutting due to the very small plates with which the ties are equipped. The records on these ties were furnished the laboratory by the Northern Pacific.

Summary

The following conclusions seem justifiable on the basis of the test tracks described here.

Cottonwood—The creosoted cottonwood ties in the Northern Pacific tracks at Lo Lo, Mont., and Marshall Junction, Wash., are giving excellent results, having been in service about 18 years with only a small percentage removed. These ties should give an average life of more than 20 years. Although the creosoted cottonwood ties in the Paradise, Mont., and Lucy, N. Mex., test tracks have not been in service long enough to make a prediction as to their probable life, they, too, are giving excellent results.

Western hemlock—Data are available on only two test tracks containing treated hemlock ties; namely, at Paradise and Missoula, Mont., treated with 50-50 and 80-20 creosote-petroleum mixtures, respectively, both on the Northern Pacific. The ties in both tests are giving excellent service. The Paradise ties have been in service about 7 years and should give many years' additional service. The Missoula ties have been in service nearly 19 years with only a small percentage removed. They should give an average life of more than 20 years.

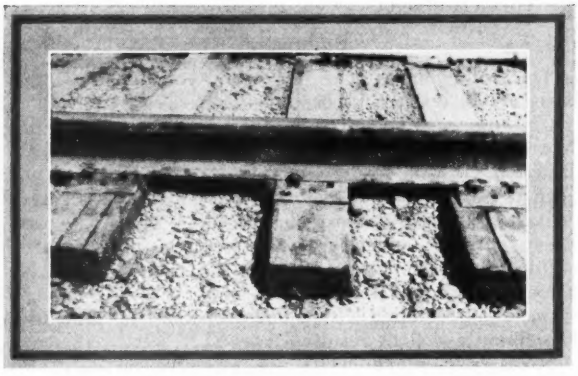
Lodgepole pine—A large number of service tests are being conducted on lodgepole pine but in only one, the Thompson Falls, Mont., test, have the ties been in track long enough to give an indication of their probable average life. After about 13 years only a small percentage of the creosoted ties have been removed, nearly all on account of "plate trouble." The majority of the ties are badly split and checked, however, and a large percentage will probably be removed in a few years for this reason. It is estimated that they will give an average life of 15 years or more. The lodgepole pine in the



Ties in Thompson Falls Test Track of the Northern Pacific, After About Thirteen Years Service. Left—Creosoted Western Larch. Right—Creosoted White Fir

test tracks of the Oregon Short Line, the Denver and Rio Grande Western and the Union Pacific should give some interesting and valuable information in the future but it is still too early to make predictions about them.

Western yellow pine—The western yellow pine ties in the various test tracks were, in general, in better condition than those of other species similarly treated. The ties in the Thompson Falls track have now been in service about 13 years, with a small percentage removed on account of "plate trouble." It seems reasonable to predict an average life of 18 years or more for these ties. The ties of this species in the other test tracks have not been in service long enough for an estimate to be made of their average life. Officers of some of the railroads operating in the Rocky Mountains consider lodgepole



Cottonwood Ties Treated With a 50-50 Mixture of Creosote and California Oil, in the Test Track of the Northern Pacific Railway at Paradise, Mont. Photographed After About Seven Years Service

and western yellow pine more suitable for ties than any of the other species available in that region.

Douglas fir (mountain type)—The creosoted mountain Douglas fir ties in the Thompson Falls, Mont., track have been in service 12 to 13 years, with only a small percentage removed. It is believed that these ties will give an average life of 15 years or more. The zinc treated ties in the test track at Plains, Mont., have been in service about 21 years and about 82 per cent have been removed. It is estimated that their average life will be between 18 and 19 years. It appears that these ties will give a longer average life than the creosoted mountain Douglas fir ties in the Thompson Falls track. This is contrary to what would generally be expected of ties treated with the foregoing two preservatives. It is probable that the differences in service conditions in the two tracks account for the variations in the results. If ties treated with the two preservatives had been set in the same track the comparison would probably have been reversed. Turning over the zinc treated ties may also be responsible for their better showing as the creosoted ties have not been turned. The test sections in the Oregon Short Line contain Douglas fir ties treated with zinc chloride, zinc chloride and fuel oil by the two movement process, and creosote. The results to date indicate that the zinc-oil and creosoted ties are in better condition, in so far as checking and splitting are concerned, than those treated with zinc chloride alone. It is too early, however, to predict the life to be obtained from these ties.

Douglas fir (coast type)—While coast Douglas fir is not a Rocky Mountain species, its inclusion in several of the test tracks examined makes it possible to compare this commonly used species directly with the Rocky Mountain species under conditions obtainable in the Rocky Mountain region. The oil treated ties in the Oregon Short Line and Northern Pacific tracks are giving good service after periods of about 4 to 7 years. In general the zinc treated ties in the Oregon Short Line show more splitting and checking than the oil treated ties of the same species.

Engelmann spruce and white fir—The creosoted white fir ties in the Thompson Falls track, after 13 years of service, show a low percentage of removals for mechanical wear and "plate trouble." It is believed that they will give an average life of at least 15 years. This record is exceedingly interesting since this species has generally been considered very inferior for ties. While the Engelmann spruce and white fir ties in the Oregon Short Line tracks have been in service only a relatively short time it is interesting to note that those given an oil treatment are in good condition and compare favorably with the oil treated ties of other species in the same tracks. The belief has been expressed that Engelmann spruce ties break in service more frequently than lodgepole pine and other Rocky Mountain species. The condition of the Engelmann spruce and white fir ties in the Oregon Short Line tracks did not bear out this belief. While a few broken ties were observed they were not confined to any particular species or treatment.

Western larch—The zinc treated western larch ties in the Plains, Mont., test track have been in service about 20 years with a little more than 72 per cent removed. It is estimated that these ties will give an average life of between 18 and 19 years. The creosoted ties in the Thompson Falls, Mont., test tracks have been in service about 13 years, the only removals being on account of "plate trouble." These ties will probably give an average life of 15 years or more.

Corkbark fir—The number of corkbark fir ties examined was not sufficient to enable any definite conclusions to be drawn regarding this species although the results would indicate that because of its low mechanical strength, it is not suitable for ties that are to be used under heavy traffic.

Pinon pine—The majority of the untreated pinon pine ties in the Nevada Central are in good condition after about 3 years' service. Further service data on these ties must be made available before conclusions can be drawn regarding the suitability of this species for use untreated.

Preservatives—It is of interest to note that in general the ties in the Oregon Short Line track treated with straight zinc chloride were checked, split, and plate worn more than those of the same species treated with creosote, creosote coal-tar mixtures, creosote coal-tar fuel-oil mixtures, or zinc chloride and fuel oil by the two-movement process. This further bears out the belief that a straight zinc chloride treatment for ties to be used in very dry climates, such as prevails in southern Idaho, is not entirely satisfactory. The zinc-oil two-movement treated ties in the Oregon Short Line were, in general, in good condition. From the results to date, the process appears to have merit although definite conclusions cannot be drawn until the ties have been in service for a longer period.

General

Hewed ties of a given species and treatment usually were found to be checked and split more than sawed ties. Anti-checking irons, which were applied before treatment to some of the zinc-treated mountain Douglas fir and western larch ties in the Hammett-Reverse track of the Oregon Short Line, did not appear to be effective in reducing checking and splitting.

Concrete Trestle No Bar to Raising Track

Quick and effective method developed by the Burlington avoids removal of track or deck slabs

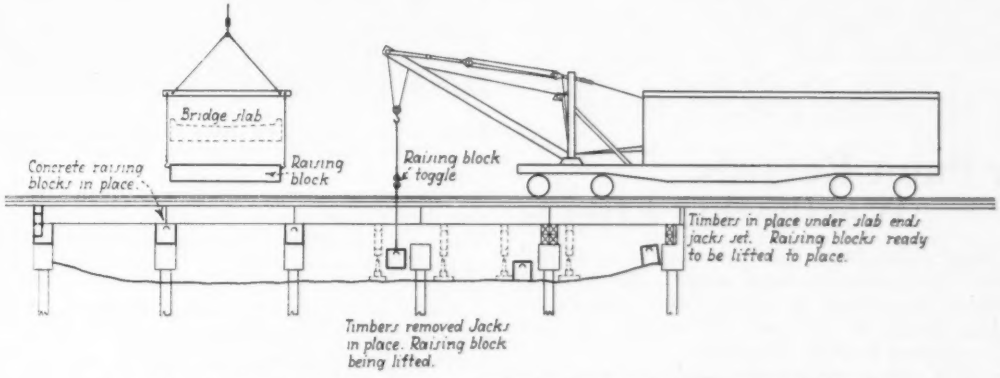
AN OBJECTION sometimes raised to the construction of reinforced concrete pile trestles is that, because of their permanent character, all or part of the original investment must of necessity be lost in case changes in alignment or grade are made later. The Chicago, Burlington & Quincy, upon which this form of construction is standard, does not find this a valid objection, as it is common practice on that road to raise concrete trestles whenever it becomes necessary to raise the grade of its tracks in the vicinity of such structures. How this is accomplished can best be shown by giving a description of the methods used in a specific case.

Recently, it became necessary to raise the grade of the track 2 ft. 6 in. over a concrete pile trestle on this road. Precast raising blocks were made at the central casting yard at Havelock, Neb., and, after proper curing, they were transported to the site of the work and unloaded in such a position as to permit setting them in place in a minimum of time when this part of the work was ready to be undertaken. Heavy lifting stirrups were cast in each end of these blocks to facilitate handling by means of an I-beam equalizer.

In unloading, one second-hand timber, 9 in. by 24 in. by 20 ft. was laid flat on the ground parallel to each bent, but far enough away so that when the concrete block was lifted it would clear the cap of the bent. Half of the length of each of these timbers extended under the bridge. A set of 3 in. pipe rollers were placed on each timber and the raising blocks were unloaded from the car and placed on the rollers. Each block was then launched into place by hooking the derrick load line in the lifting stirrup at the outer end of the block and giving a side pull.

The bridge in question consists of five spans of the railway's standard concrete slabs, resting on concrete caps which, in turn, are supported on concrete piles. The deck consists of two lines of slabs, each of which is 7 ft. wide, the whole design being shown in the drawing. The slabs had been raised to the final elevation and placed on wood blocking prior to the unloading of the concrete blocks. The next step in the operation was to raise the slabs so that they were slightly above the final elevation in order to allow sufficient room to remove the blocking and swing the raising blocks into place without danger of binding. Jacks were set far enough back from the bents to clear the concrete blocks during this operation.

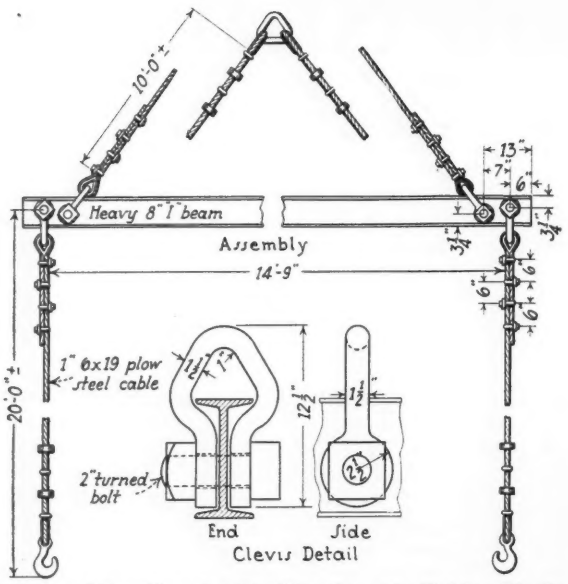
As soon as the temporary shims were removed a thin coat of mortar was spread upon the top of the cap, and mortar and a sheet of zinc were placed on top of the raising block. The block was then raised by means of an equalizer, the derrick was moved enough to carry the block over the cap, upon which it was landed, and the slabs were quickly lowered to a full bearing on the raising block.



Sketch Showing Method of Raising Concrete Trestle and Sequence of Events

Provide Special Equalizer

A special form of equalizer was designed for handling these blocks with a view to avoiding the necessity of removing and replacing the slabs and the track structure. As already stated, the deck consisted of two lines of concrete slabs each 7 ft. wide, so that it was necessary to design the equalizer to clear this 14-ft. width. As shown in the drawing, this device consisted of a heavy section, 8-in. I-beam supported by 1-in. steel wire ropes depending from a triangular link, into which the hook of the derrick load line engages. Suspended from both ends of the I-beam by means of clevises were 1-in. steel wire ropes 20 ft. long, equipped at the lower ends with heavy hooks which fitted into the lifting stirrups at the ends of the raising blocks. Details of the clevis and the connections at the ends of the I-beam are shown in the drawing. Through the use of this equipment the entire operation was carried out



Details of Equalizer for Handling Concrete Raising Blocks

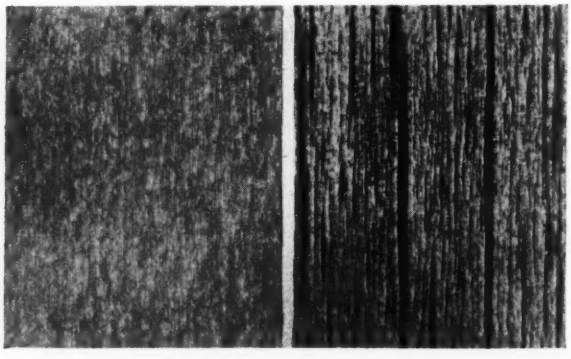
quickly with no interruption to traffic and with a minimum disturbance of the bridge deck and track structure.

The work was done under the supervision of F. T. Darrow, assistant chief engineer in charge of lines west of the Missouri river. E. M. Anderson, late supervisor of bridges, who also designed the equalizer, was in direct charge of the field operations.

How Paint Retards Weathering Effects

THE Forest Products Laboratory of the United States Forest Service made some tests recently to determine the extent to which paint retards the weathering effects of sun and rain when softwood lumber is exposed to these elements.

In the first test a softwood board was carefully planed to a smooth surface, and then exposed to the weather for some time without a protective coating

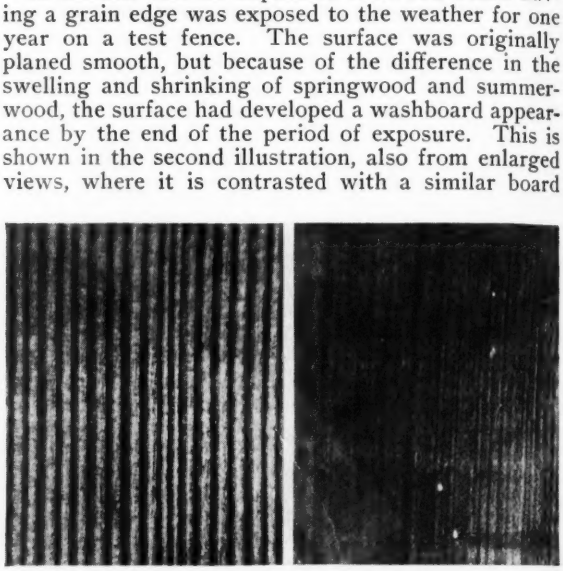


Enlarged View of a Softwood Board, Showing (at right) the Effects of Weathering

of any kind. Enlarged views of this surface before and after exposure are shown in the illustration. The very evident disintegration was not caused by decay, since examination failed to show wood rot organisms in the wood cells, and when the surface was planed away, bright wood, free from checks, was found underneath. Rather, the surface cracking and checking is attributed solely to the effects of swelling and shrinking set up in the outside layers of the wood as the surface was alternately wet and dried by natural causes, while the central portion, or core, remained practically fixed.

Produced Washboard Appearance

In another test an unpainted softwood board having a grain edge was exposed to the weather for one year on a test fence. The surface was originally planed smooth, but because of the difference in the swelling and shrinking of springwood and summerwood, the surface had developed a washboard appearance by the end of the period of exposure. This is shown in the second illustration, also from enlarged views, where it is contrasted with a similar board



Effect of Weathering on Edge-Grain Softwood Board and (at right) the Protective Value of Paint

from the same species which was given three coats of ordinary house paint and exposed for the same length of time. It will be noted that the only irregularities on the latter surface are the marks made by the paint brush.

Weathering, and the eventual destruction of the wood when it is exposed to the elements, can be prevented only by maintaining an adequate protective coating of paint or varnish, thus retarding too rapid changes in the moisture content of the wood.

Bill Jones' Sins

You know the favorite pastime of the people in the U.S.A. is to confess to the other fellow's sins. We go to church and hear a sermon about how wicked people are and immediately look around to see who we know that the sermon fits. And we tell the good wife that we bet John Smith was squirming when he heard that sermon. It never occurs to us that maybe the preacher was talking to us.

That is the way also when the "boss" puts out a talk about bad conditions on the railroad. We know for certain he was talking about Bill Jones' section and not about ours so we start feeling sorry for friend Bill and get so busy thinking about Bill that we cannot see what is wrong with our own section.

Occasionally some foreman gets into trouble and has to come up on the carpet to discuss his shortcomings. Invariably he makes the statement that he has never been in trouble before and that, so far as he knows, his work has always been satisfactory, whereas as a matter of fact practically everyone on the railroad has known for months or years that his work has been anything but satisfactory.

It is too bad that so many of us do not understand anything but rough treatment and that we cannot act on suggestion. If we are honest with ourselves and are interested in doing our best, no one will understand our weaknesses and limitations as well as we do. And by turning the searchlight of criticism on ourselves instead of on John Smith and Bill Jones, we will all profit.

So long as we confess the other fellow's sins for him and fail to admit to our own, we surely need someone to pray for us; and so long as we think the instructions that the "boss" puts out hit John and Bill and not ourselves, just so long will we continue to overlook bad conditions on our own sections.

How One Division Engineer Talks to His Men

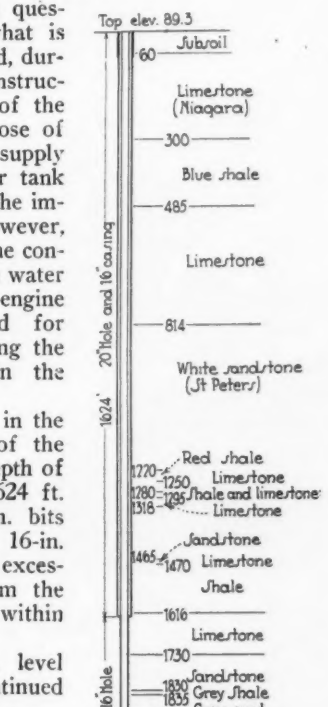
One of a series of monthly bulletins addressed to the foremen on the Northern division of the Frisco

Melting Ice Deposits Concrete in Deep Well

THE USE of a block of ice as a valve for a special under-water concrete bucket was the unique feature in the solution of a problem imposed in developing a deep well water supply in the Proviso yard of the Chicago & North Western near Chicago. The well in question was drilled in what is known as the north yard, during the extensive reconstruction and enlargement of the terminal, for the purpose of providing a source of supply for a 75,000-gal. water tank and water columns in the immediate vicinity. However, a two mile 8-in. pipe line connects this well with the water supply facilities at the engine terminal of the yard for the purpose of affording the necessary flexibility in the service.

This well, as shown in the accompanying record of the log, was drilled to a depth of 2,225 ft. The first 1,624 ft. was drilled with 20-in. bits and was cased with 16-in. pipe to exclude the excessively hard water from the water bearing strata within that depth.

Below the 1,624-ft. level the drilling was continued with 16-in. bits and water of good quality was obtained in 85 ft. of coarse sand extending to the 2,075-ft. level, but the quantity delivered in pumping tests, 450 g. p. m., was less than it was hoped could be obtained, so the drilling was continued for an additional 150 ft. Another pumping test indicated a considerable increase in the volume of water delivered, but analysis made at this time showed that the water contained sufficient quantities of salt to make it unfit for boiler use.



Log of the New Well at Proviso Yard.

Backfilled Well 150 ft.

The problem, therefore, was to salvage the well for the available supply of good water above the bottom 150 ft. and it was decided that the most practical method of doing this was to plug this 150 ft. of 16-in. hole with concrete. However, this introduced the problem of delivering the concrete to the bottom of the well through the water which filled the well within a few hundred feet of the top. This clearly called for the development of some form of bucket in which the concrete could be lowered into the well with assurance that it would be dumped when it reached the bottom and not until then.

A 10-ft. length of 12-in. pipe afforded the most convenient form for the bucket, but the problem was to provide a suitable valve at the bottom. Various ideas were advanced but the most practical one was to introduce a plug of ice at the bottom of the pipe and depend on its melting in the water of the well, which had a temperature of about 60 deg.

Holes were drilled in the lower end of the pipe so that two ¾-in. bolts could be placed across the bottom in the form of a cross. These served as the support for the ice plug. The plug itself was simply a piece about 12 in. high, cut to approximately a cylindrical form to give a loose fit inside the pipe. The concrete was proportioned to a rich and rather stiff mix, so a tight fit was not necessary to prevent serious leakage.

After the plug was placed and a charge (about 12 cu. ft.) was placed in the pipe, it was lowered into the well until it struck bottom, a procedure that required from three to four minutes. The pipe was then hoisted a short distance so that it cleared the bottom, or the concrete previously placed, after which it was necessary to wait until the ice plug melted sufficiently to release the charge. This could be determined by the slight tremor that could be felt by taking hold of the hoisting cable. This usually occurred about a minute after the bucket had reached the bottom.

This plan was carried out very successfully and 120 ft. of the well was filled up in one day, after which the well was again tested and a sample of water sent to the laboratory for analysis. When this disclosed that the water still contained some salt, the well was backfilled with concrete for another 30 ft., after which the water was found to be entirely free of salt.

We are indebted for the information given above to G. A. Saint, assistant engineer, Chicago & North Western, who is in charge of the improvements in the Proviso yard.

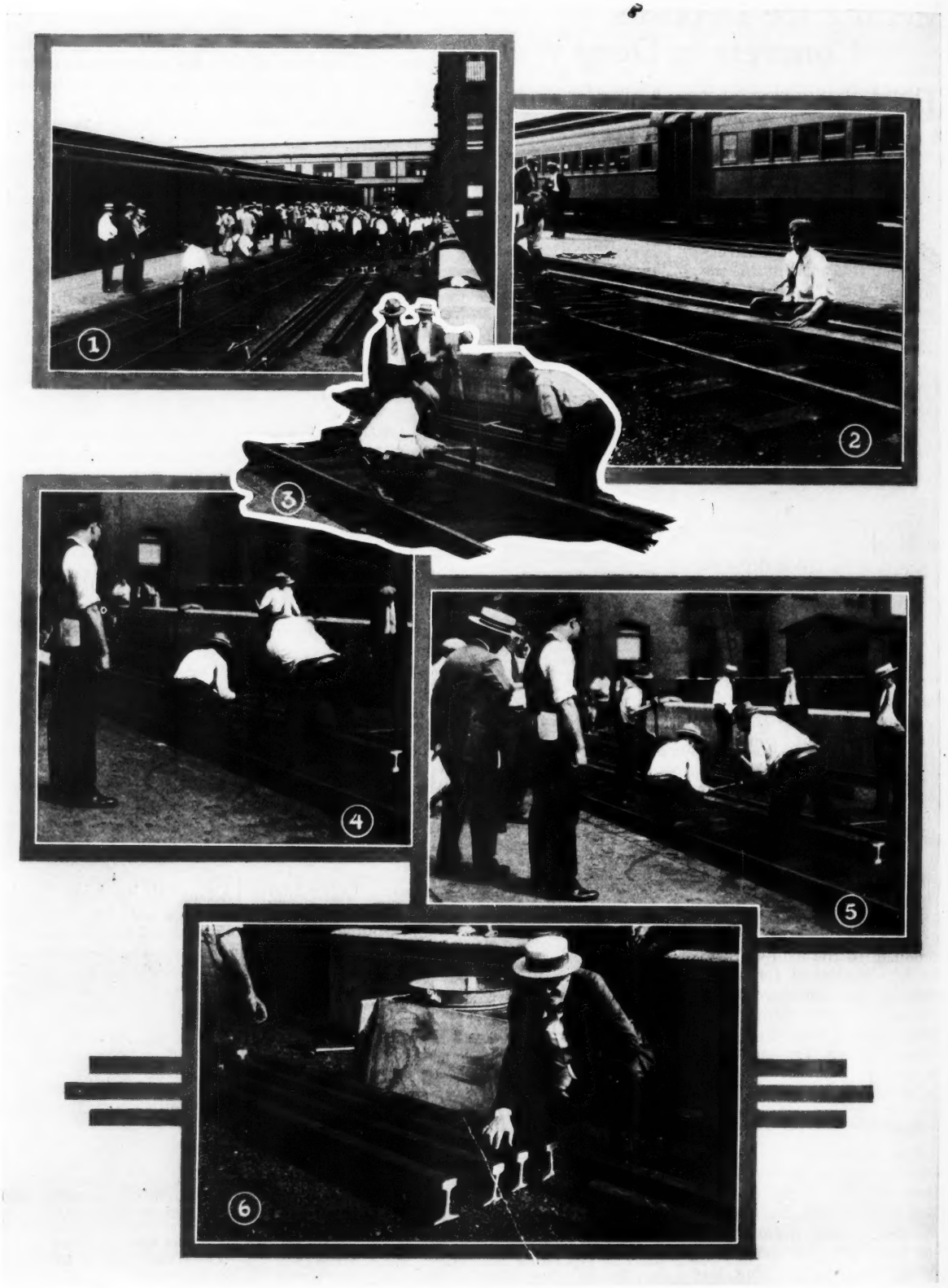
ARIZONA TRAIN LIMIT LAW.—Suit has been filed in the Federal court at Los Angeles, Cal., by the Santa Fe and Southern Pacific jointly to enjoin the enforcement of the Arizona train limit law. The Santa Fe estimates the net annual savings in freight train operation through the annulment of the law to be at least $523,000 while the Southern Pacific would save $446,000.

The Railway Industry at a Glance

Operating revenues and expenses of the Class I steam railways in the United States, from data compiled by the Bureau of Statistics, Interstate Commerce Commission

Month of June

	1929	1928	Increase 1929 over 1928 per cent
Railway Operating Revenues	3,063,139,109	2,911,402,603	5.02
Expenditures for maintenance of way and structures	**79,459,342**	**79,540 309**	**0.0**
Railway Operating Expenses	381,596,415	375,570,923	1.6
Net Railway Operating Income	105,961,315	85,992,041	23.2
Six Months Ending with June			
Railway Operating Revenue	3,063,139,109	2,911,402,603	5.2
Expenditures for maintenance of way and structures	**413,346,026**	**409,252,194**	**1.0**
Total Operating Expenses	2,245,814,799	2,208,787,093	1.7
Net Railway Operating Income	563,362,364	462,227,527	21.8

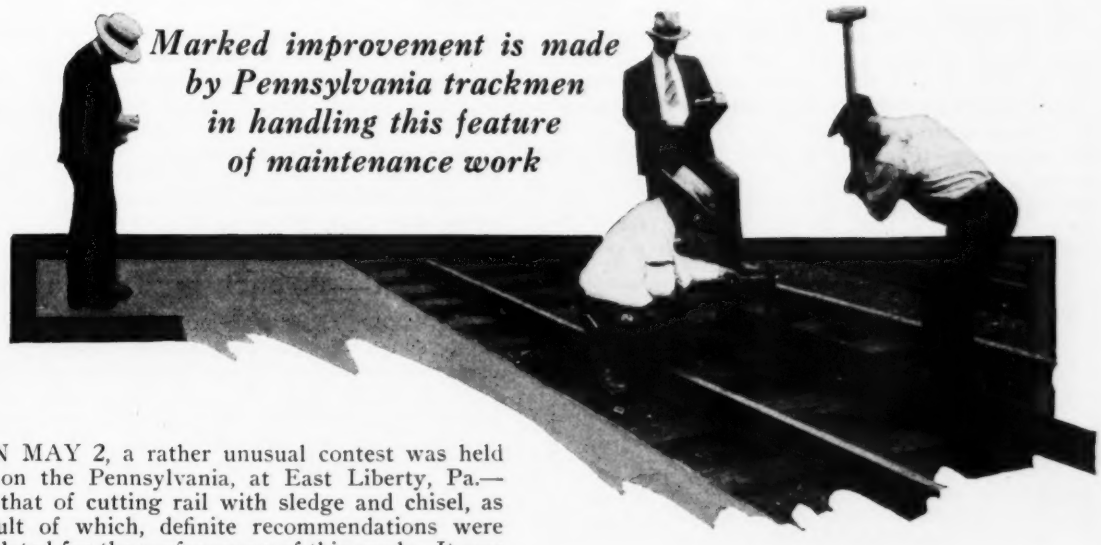


A Rail Cutting Contest on the New York Zone of the Pennsylvania

1. The Entire Party Watching One of the Contestants Get Ready to Start a Cut. 2. A Foreman and His Striker Placing a Rail in Position. 3. Making the First Cut Across the Base of the Rail for an 18-in. Cut. 4. Starting a 72-in. Cut. 5. The Cut Almost Complete. 6. Four of the Finished Rails, Note the Square Clean Breaks

Hold Rail Cutting Contest

To Develop Best Practice



Marked improvement is made by Pennsylvania trackmen in handling this feature of maintenance work

ON MAY 2, a rather unusual contest was held on the Pennsylvania, at East Liberty, Pa.—that of cutting rail with sledge and chisel, as a result of which, definite recommendations were formulated for the performance of this work. It was evident also that marked improvement has been made in the development of methods for the performance of this maintenance operation since a similar contest held in May, 1927. The principal fact established by the contest is that, when cutting rails with a sledge and a rail chisel, the best results can be obtained by not disturbing the fishing surfaces or by cutting the heads.

In the contests which have been held, the primary purpose has been to develop the best practice in cutting rail, using a sledge and chisel, so that where this method of cutting rail is found necessary or advisable, the foremen will be in a position to carry it out in the most effective manner. In both contests, all 12 divisions of the Central region of the Pennsylvania were included, the various divisions being represented by foremen chosen previously by competitive contests held on their respective divisions.

Actual Track Conditions Prevail

Both contests were carefully planned and carried out, and the settings, in so far as possible, were made similar to actual conditions encountered in this type of work. Sufficient worn rails of 130-lb. P. S. section, which had been tested previously for surface hardness on each side of the head at the points to be cut, were provided for the contest. New cutters were secured from the storehouse stock, and for some time prior to their use, were placed in warm water having a temperature between 100 and 130 deg. F.

Ten-pound sledges were used throughout the contests and two cuts were made by each contestant; one 18 in. from the end of the rail, and another 72 in. from the end. The contestants were permitted to choose and place their own blocking, and could also designate, if they desired, the striker who was to assist them.

In actually making the two cuts, only one cutter could be used, although a contestant was privileged to sharpen his cutter at any time during his performance if he desired.

If a cutter was broken while making either cut, the complete record of the foreman using the cutter was thrown out and he was required to start again with his first cut, a new cutter being provided. No dropping or throwing of the rail to assist in making the breaks was permitted on either cut.

Method of Scoring

In the 1929 contest, 100 points was considered as a perfect score, and the following method of rating was used, based on the character of the fishing surface after the cut, the squareness of the cut, the time consumed, and the number of blows required. Forty-five points were considered a perfect score for the condition of the fishing surfaces after the cut, while each 1/64-in. total projection at the four points in contact with the splices penalized the contestant three points. On this basis a total projection of 15/64 in. resulted in a zero score. Fifteen points were considered a perfect score for the squareness of the cut, both vertical and horizontal, while each 1/64-in. deviation from a true vertical or horizontal cut penalized the contestant 4/10 of a point.

For time consumed, a perfect score was considered as 20 points, this allowing two minutes for a cut. Each 40 seconds consumed in excess of the first 120 seconds was valued at one point, this giving a contestant a zero score on this phase of the work after 15 min. and 20 sec. Twenty points was allotted for a perfect score of 40 blows in making a cut, while each 20 blows in excess of 40 blows decreased the contestant's score one point, this resulting in a zero score after 440 blows.

A number of variations in practice were employed by the various foremen in the contest, and as a result there was considerable variation in the quality of

the cuts made and in the time and number of blows required. In almost every instance, however, the 1929 performance was better than that of 1927. This is indicated in the accompanying tables, which show that whereas the maximum disturbance made in the fishing surfaces of the rail was 7/64 in. in 1927, it was only 4/64 in 1929, and that whereas the maximum variation from a square cut was 9/16 in. in 1927, it was 8/16 in. in 1929.

Even more pronounced evidence of the improvement made in cutting rails with a chisel is seen in the record of the time consumed and number of blows required to make a cut. In 1929 the maximum time required to make a cut was 21 min. 50 sec., and the minimum time was 2 min. 2 sec. This compares with the maximum time required to make a cut in the 1927 contest of 52 min. 20 sec., and a minimum time of 3 min. 48 sec. The average time required for all cuts in the 1929 contest was 8 min.

Results of 1927 and 1929 Contests—Cuts 18 In. from the Ends of Rails

	Quality of Fracture: Fishing Surface Variation in 1/64 In.		Quality of Fracture: Squareness Variation in 1/64 In.		Time				Blows Number to Cut	
					1929		1927		1929	1927
	1929	1927	1929	1927	Min.	Sec.	Min.	Sec.	1929	1927
Maximum	4	6	24	36	21	50	19	23	353	392
Minimum	0	0	0	0	2	13	5	45	52	106
Average	0.33	2.04	10	15.67	8	34	11	50	170	243.42

Results of 1927 and 1929 Contests—Cuts 72 In. from the Ends of Rails

	Quality of Fracture: Fishing Surface Variation in 1/64 In.		Quality of Fracture: Squareness Variation in 1/64 In.		Time				Blows Number to Cut	
					1929		1927		1929	1927
	1929	1927	1929	1927	Min.	Sec.	Sec.	1929	Min.	1927
Maximum	4	7	32	21	15	20	52	20	262	1,035
Minimum	0	0	4	0	2	2	3	48	41	97
Average	0.25	2.54	14	9	7	40	12	56	151	261.92

34 sec. for the 18-in. cuts, and 7 min. 40 sec. for the 72-in. cuts. This compares with an average time of 11 min. 50 sec. for the 18-in. cuts in the 1927 contest, and an average time of 12 min. 56 sec. for the 72-in. cuts in that year.

An average of 170 blows was required to make the 18-in. cuts in 1929 as compared with 243.42 in 1927, and an average of 151 blows was required to make the 72-in. cuts in 1929, as compared with 261.92 blows in 1927. The minimum number of blows required to make a cut in the 1929 contest was 52, which was a marked improvement over the minimum number of blows, 97, which were required in the 1927 contest.

Viewed as a whole, the 1929 contest showed an improvement over that of 1927 of approximately 60 per cent in the number of blows required, and 40 per cent in the time required. The average regional improvement during the two years was established at 32 per cent.

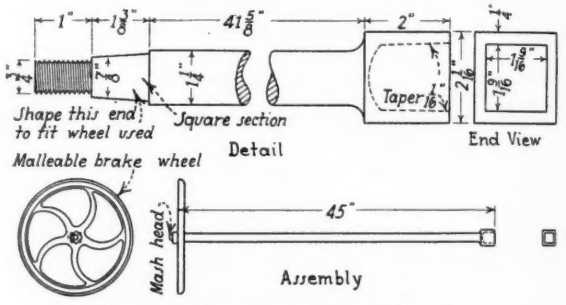
Winners Use Same Method

The winners of the 1929 contest were from the Akron division, represented by C. H. Ulrich as cutter, with an average of 92.3 points for both cuts, and the Panhandle division, represented by J. I. Stiteler, which had an average rating of 90.3 points for both cuts. The methods used by the two winning contestants were practically the same. In both cases there was no disturbance of the metal in the fishing surfaces of the rails, and the average number of blows and the time consumed were the lowest.

The blocking used by both winning divisions was the same, consisting of an L-3 splice-bar placed directly under the point of cut, and another splice-bar placed under the opposite end of the rail. In actually making the 18-in. and 72-in. cuts, the Akron division representative struck two blows on each side of the base of the rail, and then turned the rail head downward to the splice-bar supports and cut across the base until it was fractured. In the cuts made by the Panhandle division representative, the rail was immediately turned head downward on the supports and cut across the base until fractured. The results of the 1929 contest again proved that, when cutting rail with a sledge and rail cutter, the best results can be obtained by not disturbing the fishing surfaces or cutting the heads of the rails.

A Handy Wrench for Bridge Gangs

IN BRIDGE work, it frequently becomes necessary to tighten bolts that are not easy of access. In many cases, too, ordinary forms of wrenches cannot be used because of the confined space in which the bolts are placed. To give easier access to such bolts, as well as to provide a form of wrench that could be used to advantage where the clearance is small, E. M. Anderson,



Fitting-up Socket Wrench for Bridge Gangs

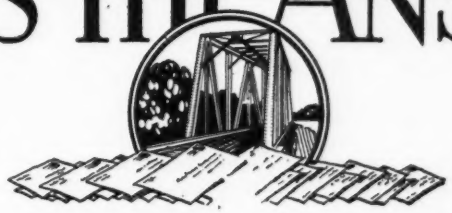
late supervisor of bridges on the Chicago, Burlington & Quincy, designed the fitting-up wrench which is shown in the illustration.

It is made from a common freight car brake wheel and has a stem a little more than three feet long, with a socket at the lower end. In most cases, the operator can stand nearly upright while using the wrench and through the use of the brake wheel has the advantage of great leverage. This tool has been found especially adapted for use by gangs engaged in tightening fitting-up bolts in the strengthening of steel bridges.



Bunk Cars of the New York Central Maintenance of Way Camp in New York City

WHAT'S THE ANSWER?



Have you a question you would like to have someone answer?

Have you an answer to any of the questions listed below?

QUESTIONS TO BE ANSWERED IN THE NOVEMBER ISSUE

1. *Is it advisable to return to the stores department, or some other central point, over winter, the extra tools that are used by enlarged section gangs during the summer season, or should they be allowed to remain in the section tool houses?*

2. *What factors should govern in determining whether a pipe or a box culvert shall be used for any given opening?*

3. *Should snow fences be set parallel to or at an angle to the track, and if the latter, at what angle? How far back from the track should they be placed?*

4. *What are the relative merits of plaster and wood ceilings for the interior walls of small stations?*

5. *Should the outer rails of curves be elevated for the fastest trains, and if not, how should the proper elevation be determined? What, if any, limit should be set on the amount of superelevation?*

6. *What are the relative advantages of tank spouts and water columns, and under what conditions can each be used most satisfactorily?*

7. *What is the best method of preventing pocket gophers and muskrats from burrowing in roadway embankments?*

8. *To what extent can ordinary bridge maintenance be carried on during the winter? What are the relative advantages and disadvantages of doing the various classes of bridge work at this season?*

Turnouts with Relay Rail

When relay rail is installed on secondary lines, is it good practice to use the turnouts released with the rail or should new turnouts be furnished?

New Turnouts Should Be Used

By L. C. STAHL
Assistant Engineer, Central of Georgia, Columbus, Ga.

When relay rail is installed on secondary lines new turnouts should be used, even though the worn rail does not fit exactly with the section of the rail in the new turnout material. It is the practice of the road with which I am connected to build up any badly fitting joints which may occur at switches by means of a portable welding outfit, thus eliminating any trouble with the use of new material in the switches.

It is usually the case that the released turnouts are more badly worn than the adjacent rail and when they are later replaced with new material the same problem arises as if new material had been used at the time the rail was installed.

Favors New Turnout Material

By J. J. DESMOND
Roadmaster, Illinois Central, Chicago

Relay rail is generally expected to have an equal or greater life on secondary lines than it had in the main line tracks in which it was laid when new. As a general proposition, the turnout material which is released with the rail is worn to a much greater extent than the adjoining rail and is seldom satisfactory for main track use, even on secondary lines. This being the case, it usually is desirable to use new turnout material for all main line switches and, if the released turnouts contain material that can be salvaged with economy, to use this partly worn material on inside switches which are not used as frequently and where slow speed movements are made.

It is not unusual to find a considerable number of battered joints in the released rail. If the rail is to be used without having the ends sawed, care should be used to select rail having the least worn and battered ends to join up with the new turnout material. A still further refinement, and one that has been found very satisfactory in numerous instances, is the building up of the rail ends through the turnout by welding.

Because relieved turnouts are almost always considerably worn, their life, when relaid in main track service, even on secondary lines, is relatively short. As a result, it is not long before new material is needed, at which time the same problem presents itself of trying to join new and old material. For this reason, the writer can see no justification in trying to salvage released turnout material for main track use with relay rail.

New Material Not Always Necessary

By JAMES F. BURNS
Assistant Engineer Maintenance of Way, Louisville & Nashville, Louisville, Ky.

Whether this should be done depends largely on the condition of the second-hand turnouts. If they are not in first rate condition, they should not be used, but if in good condition, it is good practice to use the turnouts that were released with the rail. When this is done, however, the lead rails should be numbered before being removed from the track, and the entire turnout shipped together so that, when replaced in the secondary line, the rails can be installed in the same relative posi-

tion which they occupied originally. This means a saving in rail, since it then becomes unnecessary to cut the lead rail, and insures good joints at the switches and frogs.

When the rails released are of the A.R.A.-B section, somewhat worn on the head, it is frequently good practice to use new frogs of the A. S. C. E. section, 10 lb. per yard lighter in weight. As the two sections have the same fishing line, the worn head of the A.R.A. heavier rail will make a better joint with the head of the new lighter rail of the other section, than it will with the new head of a rail of the same section.

When necessary to order new switches, attention should be given to the condition of the stock rail, for the new switch point will not make a good point with a worn stock rail, and the passage of a few trains over the switch may chip off the switch point so that the condition is worse than that which would have resulted if the worn switch point had been used.

Testing Foundation Soils

What is the best method of testing the bearing power of soil to determine the allowable pressure per square foot?

Soil Tests Are Comparatively Simple

By Assistant Engineer of Bridges

Railway engineers are seldom required to make the complicated tests which are necessary in investigating the conditions where heavy building foundations are to be installed. Their problem is usually simpler, in that the structures they are concerned with, are buildings of comparatively light loading, bridge piers and abutments and retaining walls, few of which may be expected to call for unusually high unit loading.

It is well known that all soils compress when loaded, and exhibit a tendency to flow when heavily loaded, this tendency being more pronounced at the edges of the area over which the load is distributed. It is also established that, owing to this characteristic, the bearing power of any soil, as determined by tests, is greater as the area subjected to the load is increased, even though the unit loading remains unchanged. An ideal condition in making tests of this character, therefore, would be to make the test over an area identical with that of the foundation which is to be installed. It is impractical to do this, however, owing to the cost and the difficulties of providing the loading, so that the usual practice is to take a small area for the test, since the results obtained will be conservative and on the side of safety.

Our practice is to sink a test pit immediately adjacent to the site of the structure, carrying it to the bottom of the proposed footing, making certain that the soil is identical with that which is to support the structure. The surfaces at the bottom and sides are made smoothly, but sheeting is used only where absolutely necessary. A square post, 12 in. by 12 in. in area, is lowered in the pit and held in an upright position in such a manner that it is free to move vertically, but does not bring any pressure on its side supports.

The post is then loaded to bring about half of the expected unit load on the soil and allowed to stand until settlement ceases. An additional load, equivalent to half the load already applied is then placed and further settlement noted. The full load is then applied and when settlement is complete, enough more is added to equal a load 25 per cent in excess of that to be used, and the final action recorded. During the entire test, readings are taken at regular intervals, varying from two to four hours.. In some cases, when settlement seems to have ceased the test load is allowed to remain overnight and a further reading is taken in the morning before the additional load is applied.

Use a Square Post

By G. A. Haggander
Bridge Engineer, Chicago, Burlington & Quincy, Chicago

In railway service, practically all necessity for testing the bearing power of soils arises in connection with the ordinary types of piers, abutments, or retaining walls, so that the more complicated investigations, which must be made in connection with the construction of heavy building foundations, are not necessary.

It is the practice on the Burlington to place a square post, 12 in. by 12 in., on the soil to be tested, apply a load and record the settlement at regular intervals. The excavation should be smooth and down to final grade, and should be representative of the soil which is to support the structure. An area of one square foot is rather small, as the soil is not confined at the four sides and will flow more easily when loaded than it would if a larger area were tested. The larger areas, however, require a much greater total load to cause settlement, and this is sometimes difficult and expensive to place. Where an area of one square foot is used, the post should be placed as near as possible to a corner or edge of the excavation, in order to confine the soil.

The method of loading will vary, of course, as the local conditions vary, but in all cases the post must be blocked or supported horizontally, so that it is held in an upright position without allowing the brace to assume any of the load that is placed upon it. Pieces of rail are usually used to impose the load. A load somewhat less than the unit pressure which it is desired to use, is first imposed, and readings taken shortly after it has been placed. Readings are then taken every three or four hours, until no further settlement is noted. The load is then increased gradually and the readings taken as before. By making the test in this manner, the rate at which only a small permanent settlement takes place can be determined.

Inspection of Buildings

What details should be given particular attention in the inspection of buildings?

Proper Inspection Takes Many Details Into Account

By P. Aagaard
General Building Inspector, Illinois Central, Chicago

This question is an exceptionally broad one, since it may be interpreted to cover both inspection during construction and the later inspections for maintenance. The answer is, therefore, divided into two parts.

In construction, the first thing that should be done by the inspector is to make a thorough study of the plans and specifications so that he will be familiar with the extent and all of the requirements of the work. He should check carefully all foundation measurements, since any errors in foundation dimensions are usually both difficult and costly to correct, not to mention the delays entailed, if they are not discovered before the construction of the superstructure is started.

As a general rule, the most uncertain features of any new work are those which pertain to the foundations. Where the foundation excavation extends to any depth, careful consideration should be given to the methods which the contractor proposes to employ in carrying on this part of the work, particularly the installation of sheeting, the pumping equipment and the disposal of the excavated material. The inspector

should know the quality of the aggregates, the proportions of the various materials used and the methods and time of mixing the concrete, as well as the details of the placing of the reinforcing and concrete in the forms.

He should familiarize himself with the requirements for materials for the superstructure and should know that they meet the requirements of the plans and specifications and that they are properly placed. In many instances, it is desirable to make sketches of certain details which can be carried in the pocket for ready reference at the point where the installation is being made.

Every inspector should keep a diary in which is recorded daily all information pertinent to the work and its progress, including instructions which later may be used by the contractor as a basis for a bill of extras. He should also record any information which may be of subsequent help to maintenance officers or which may be valuable in connection with disputed points over which there may be litigation.

Inspection for maintenance purposes, likewise requires the observation of so many details that only a few of them can be mentioned. Special attention should be given to any evidence of settlement. Discover the cause of this trouble and determine if possible what remedy should be applied. It is important to know whether settlement is occurring through faulty construction or because of undermining of the foundations.

Flues and chimneys should be investigated thoroughly to see whether they are properly lined and are without cracks or other openings which may cause fires.

The next most important item is the roof covering the structure. In many instances, buildings are ruined or materially damaged as a result of defective roofs. Again much money can be saved by making repairs to a roof when the defects are small. Leaky roofs cause deterioration, not only to the steel or timber which support them, but also cause great damage to ceilings, walls, and the furnishings in the buildings.

Complete Inspection Includes Many Details

By A. T. Hawk
Engineer of Buildings, Chicago, Rock Island & Pacific, Chicago

A thorough inspection of a building requires the observation of so many details that space will hardly permit all of them to be mentioned. Among the important items, however, is that of the foundation. The inspector should search for signs of settlement, and, if these are found, an investigation should be made to determine the cause, the extent of the trouble and the best method of overcoming it. Great damage may result from undermining, or a failure of the soil to support the structure properly and, if the condition is sufficiently aggravated, the building may become unsafe or fail entirely.

The next most important part of a building with respect to maintenance and the possibilities of damage is the roof. A defective roof not only causes damage to the walls and contents of the building, but may also cause structural damage that is costly and difficult to repair. Not only should the roof proper receive inspection, and a search be made for possible leaks, but the condition of the flashings, the gutters and the downspouts should be investigated closely.

Of equal importance is the condition of the chimneys and flue openings. These should be examined closely, both above and below the roof, for cracks that might cause fires, and to determine whether they are properly lined with flue lining.

On frame buildings, the condition of the siding should be noted, particular attention being given to corner boards, facia, cornice, and plancia, to determine their condition and whether in need of renailing. In all types of buildings, the exterior and interior painting should be inspected and a note made of whether the structure is in need of a complete repainting or whether only certain parts should be repainted.

In the interior, the condition of the plastering, ceiling or other wall finish should be observed to determine whether repairs are needed. The floors, the doors and door frames, the sash and window frames, and the fixed and portable seats in passenger stations, should be inspected closely to determine their general condition, and also the condition of the hardware, glazing and weather tightness.

The cleanliness and sanitary condition of all classes of buildings should be noted carefully. The presence of inflammable rubbish, oil soaked cloth or waste may constitute a serious fire risk, not alone to the building directly involved, but also to adjacent structures in the group of which it is a part. Sanitation and cleanliness have a bearing on the health of the employes who are stationed in any building, while their influence, even though indeterminate is none the less real on the patrons of the road, who secure their contacts with the railway through its stations, freight houses and offices.

In buildings that are wired for telephone, telegraph or electric lighting, the incoming wires should be examined to determine whether they constitute a fire risk as installed. At stations, freight houses, shops, oil houses and offices, platforms and cross walks should be inspected and particular note made for immediate correction of any condition that might result in personal injury.

While the more detailed inspection of heating plants, plumbing, drainage, wiring, lighting and fire prevention equipment probably should be left to representatives of the departments directly responsible for their installation and operation, the building inspector should examine all of them for obvious defects and to note their general condition.

A complete building inspection requires that attention be given to many more details, but the general features of such an inspection and the more important items which should be observed have been mentioned.

Caring for Tools at Night

When work is being done by extra gangs, what, if any, advantages are gained by providing tool boxes, so that tools may be left at the site of the work at night?

Tool Boxes an Advantage

By Morris D. Carothers
Assistant Engineer of Maintenance, Baltimore & Ohio Chicago Terminal, Chicago

There is a definite advantage in providing extra gangs with tool boxes at the site of the work. Every extra gang uses several different kinds of tools, regardless of the character of the work it is performing, and usually has an ample equipment of both heavy and bulky track tools.

From the standpoint of cost alone, the tools should be stored near the work, as it is much easier and requires less time to move the tool boxes at intervals, as required, than to load and transport the tools in both directions every day. If the tools are brought in to headquarters every night, it becomes necessary to handle them twice daily in addition to the work of storing them. This re-

quires time which might better be employed on productive work.

Another consideration is that the hauling of the men and tools on the same motor cars and trailers is not entirely safe and if an accident does occurr, the presence of the tools on the cars frequently makes the result more serious. From a safety point of view, therefore, the tool boxes are also a good investment.

Where boxes are provided so that the tools can be kept on the site of the work, one man should be assigned to the work of caring for them and should be given full responsibility. It is wise to choose a man for this purpose who has sufficient ability to make light repairs to such tools as can be repaired in the field. If this is done, the increased life of many of the tools will be entirely out of proportion to the cost involved.

Near the end of the day, this man should collect all tools not in actual use and store them. At quitting time, the men should bring the tools they have been using to the tool boxes, which should be conveniently located for this purpose, and place them in an orderly manner in the proper places in the boxes. Edged tools should be handled and stored so as not to mar the cutting edge. If the work of caring for the tools in this manner is organized properly, a material saving in time, both in the morning and in the evening, will be made.

Favors the Use of Tool Boxes

By L. C. Stahl
Assistant Engineer, Central of Georgia, Columbus, Ga.

Tool boxes should always be used as suggested, where extra gangs are employed on work which does not require the moving of the boxes for long distances every few days. The advantages of this practice are that heavy tools carried to and from the work on motor or hand cars are always more or less dangerous, as the possibility exists that some of them may fall off and derail the car or otherwise injure the men. There is also a tendency on the part of some foremen to hide heavy tools such as jacks, lining bars, claw bars and bulky tools, such as picks and shovels, to avoid loading and unloading them, with the result that such tools are frequently stolen.

Tool Boxes Should Be Provided

By A. H. Reetz
Supervisor of Track, Minneapolis & St. Louis, Hampton, Ia.

In my opinion, the furnishing of tool boxes to extra gangs to eliminate the necessity of carrying tools back and forth every day is of considerable advantage. Where a gang is handled by work train there is a tendency to hurry the work of loading or unloading the tools at such an etxent that they are thrown into or out of the cars promiscuously. Heavy lining bars, claw bars and picks are thrown in with the shovels, breaking the handles or otherwise damaging them. The edges of the cutting tools also suffer seriously.

If these large gangs are moved to and from work with motor cars, tools are usually loaded loosely, although not so promiscuously or roughly, so that the hazard of the tools falling off and derailing the cars or injuring the men is a matter of considerable importance. Many track men have been injured, while some fatalities have occurred from this cause. The value of the tool boxes from this standpoint alone is worth many times their cost.

Every foreman considers it a nuisance to be compelled to handle a large equipment of tools twice every day and, unless the supervision over this feature of the work is exceptional, a large part of the tools will be hidden in the grass or weeds over night. The result of this practice is that a good many tools are lost during the season.

Where tool boxes are provided there is no incentive to hide the tools out, where they are easily lost or may be stolen. On the contrary, since nearly every laborer likes to use the same tool day after day, there is a noticeable tendency to use more care in disposing of them at the end of the day and, with a little supervision, the men can be taught the careful and proper use of tools more easily.

The first thing a contractor, to whom the cost of the tools he requires on the work is an item of importance, does when he starts a job, is to erect facilities for housing his tools and other supplies. The same purpose of conservation is served by providing tool boxes for extra gangs on the railway. Aside from eliminating the loss of tools and avoiding the risk of injury to the men, it reduces the amount of gasoline that must be consumed in the operation of the motor cars. It also facilitates the removal of the cars from the track and their replacement on account of trains.

The number of boxes that should be provided depends on the size of the gang and, sometimes, on the character of work that is being done. Generally, however, two large boxes and one small one are sufficient for any but the largest gang. For a small gang, one box, with a compartment for edged tools and small tools, will sometimes answer all requirements. One of the large boxes should be used for claw, lining and tamping bars, tamping picks and track wrenches; shovels, levels, spot boards and other bulky tools, and extra track jacks can be placed in the other; and the small box should be used for edged tools and small tools. The dimensions do not need to be excessive; if properly stowed a surprisingly large number of tools can be put in a comparatively small space.

To obtain the most satisfactory results, one man should be in charge of all tools and of their storage. Near the end of the day he can gather up all tools not then in use, thus reducing the time and confusion of preparing for the return of the men to headquarters. Where boxes are furnished and used properly, the practice results in a saving of time and labor as well as of tools, while there is a marked reduction in the risk of accident.

It Is Good Practice to Provide Tool Boxes

By G. M. O'Rourke
District Engineer, Illinois Central, Waterloo, Ia.

In my opinion, there are many advantages in providing tool boxes for extra gangs. Where this is not done the tools must be hauled to and from the job daily, thus imposing an unnecessary load on the motor car, besides consuming extra fuel. While I have no data to support the belief, I feel sure that continually loading down the motor car or trailer with heavy track tools will tend to shorten the life of the motor.

Furthermore, if the tools are taken to headquarters every night considerable time of the gang is rendered unproductive in loading, unloading and handling the tools. Furthermore, where this is done, a hazard of accident and personal injury is created, unless a separate trailer, which adds greatly to the load to be pulled, is provided.

If boxes are not provided, many times the tools are left piled, but unprotected, on the site of the work and, not infrequently, are scattered along the track with a relative high percentage of loss.

The only objection I can see against the practice is the remote possibility of the gang being called away in an emergency, in which case some delay will occur in getting the tools for the work.

Filling in the Track

When track is being reballasted, should it be filled and dressed as soon as the final lift is completed or should it be left open a few days to expedite the picking up of slack places?

Complete the Ballast Section at Once

By L. C. Stahl
Assistant Engineer, Central of Georgia, Columbus, Ga.

When track is being reballasted, it should be filled in and the ballast dressed to the standard section immediately after the final lift is completed. There is no advantage in leaving the track open, because, if this is done, slack places are sure to develop. On the other hand, there are a number of disadvantages, among which are slovenly appearance, possibility of the track buckling and the furnishing of a basin to catch water, while the ballast which has been packed under the tie is given an opportunity to work loose because it has no support.

If the original lift has been made properly and the tamping has been done well and consistently, no important slack places will develop, except at chronic soft places and these may require picking up a good many times before they have a proper surface.

Fill as Soon as Final Lift Is Completed

By G. Stafford
Section Foreman, Canadian National, Rosebud, Alta.

While the rules and instructions of the maintenance-of-way department of this road do not directly contain any definite ruling on this point, both extra-gang and section foremen have been advised by their supervisory officers from time to time that at the completion of each day's lifting, whether it be out-of-face or spot work, the track must be filled and properly dressed.

To my mind, track left unfilled is more likely to develop slack places, since it gives the tamping a chance to work loose under the bearing area of the ties. This causes a yielding condition and results in inadequate support when under impact, which always results in bad surface and disturbed alignment.

The liability of the track to "kick out" is another hazard that should be borne in mind during high summer temperatures, when the track has not been filled in and there is no ballast support at the ends of the ties.

The exposure of the inside of the road-bed to the elements for any length of time is objectionable. If subjected to continuous rains soft track will develop unless the drainage is particularly good.

There is always the possibility that the ballasting gang may be withdrawn for emergency purposes elsewhere, at any time, on short notice. In such cases, the unfinished work devolves upon the local section forces, thus causing an unnecessarily long interruption to their regular program of work, if the filling of the track has not been kept up currently.

The advisability of leaving a stretch of track open in order to facilitate the taking out of possible slack places after the lapse of a few days is open to doubt from every point of view. It is more than probable that, in the long run, it will cause a loss of time, and, in the case of high lifts, be a source of anxiety to the foreman in charge, on account of the skeletonized condition of the track. When the tamping has been done properly, slack places of an extensive nature are rare. Such places as do occur usually consist of a quarter here or a joint there, and are easily remedied. Those of any length, which appear a short time after the track has been lifted, were probably present previous to the lift being made, and in many cases are attributable to a saturated condition of the subgrade. The foreman in charge, usually a man of experience in this class of work, necessarily must be on the alert at all times to insist on conscientious but even tamping by his labor, so that the track may stand the service to which it is subjected. When this is done, the probability of slack places developing after a short while will be reduced to a minimum.

Tools for Water Stations

What tools and other equipment should be provided in water stations operated by gasoline or oil engines or by electric motors?

Tools Soon Pay for Themselves

By J. P. Hanley
Inspector of Water Service, Illinois Central, Chicago

Water stations are important units in railway operation and, since the continuity of train movement depends in large measure on an ample supply of water, the pumping equipment must be kept in operative condition at all times.

Water stations are frequently located at isolated points and, in case the machinery becomes inoperative, it is sometimes difficult to get a repairman, with a well stocked kit of tools, on the ground promptly. Such repair service is often called for at unexpected hours, and not infrequently when the repair man arrives he finds the trouble is of minor importance from a repair point of view. If the pumper is furnished with tools for making light or temporary repairs it often becomes unnecessary to call for a repairman outside of the regular working hours, thus saving considerable in the way of penalty overtime, so that a more liberal allowance of tools at such stations often pays for the added investment in a short time.

The following list of tools is suggested for stations operated by internal combustion engines or electric motors, with the idea of encouraging and increasing local maintenance:

Hand axes	1
Hack saw blades	6
Blocks, ½ in. 2-ply with 100 ft. of ½-in. rope	1 pair
Pinch bars	1
Chisel bars	1
Cold chisels, ¾-in. by 6-in.	2
Pipe cutters, ¼-in. to 2-in.	1
Drill, brace and bit pattern with chain attachment	1
Drills, ¼-in., 7/32-in., 3/8-in., 7/16-in., and ½-in.	1 each
Dies and stock, for bolts ¼-in., 7/32-in., 3/8-in., 7/16-in., and ½-in.	1 set
Dies and stock, for pipe, ¼-in., 3/8-in., ½-in., ¾-in., and 1 in.	1 set
Flat files, 10-in. and 12-in.	1 each
Round files, ½-in., 10-in., and 12-in.	1 each
Machinist's hammer	1
White lantern	1
Hand oiler	1
Hand saw	1
Hack saw frame, 12-in.	1
No. 2 shovel	1
8-lb. sledge	1
Combination vise	1
Monkey wrench, 8-in. and 12-in.	1 each
Pipe wrench, 8-in., 12-in., and 18-in.	1 each
Open end wrenches, for bolts and nuts on pumping machinery	1 set
Socket wrenches, for nuts not accessible to other wrenches	1 set

This is intended as a general list for the more important pumping stations and it should be increased, decreased, or varied from, as individual pumping machinery may warrant. Equipment manufacturers usually furnish a set of open-end and socket wrenches for their particular machines at the time of purchase. These tools should be considered when the station list is made, to avoid duplication of items.

A Limited Supply of Tools Is Desirable

By Supervisor of Water Service

Owing to the widespread effects of a water failure, every pumper should be in position to make minor repairs to the pumping machinery at all times and, when possible, temporary repairs in case of more serious trouble. Not all pumpers are equally competent, however, and the complement of tools and repair equipment which should be provided will depend on the ability of the pumper in this respect, the importance of the water station and the character of the pumping equipment.

First on the list should be a set of monkey, open-end and socket wrenches, with which every nut and bolt can be reached. Increased and uneven wear are sure to occur on moving parts if bolts and nuts are not kept tight, while serious breakdowns will follow if this neglect is continued. One or more pipe wrenches to fit the pipe in the plant should also be included.

If the pumper is to be depended on to make any further repairs, he should have a machinist's hammer, a hack saw with extra blades, a cold chisel, round and flat files, a pinch bar, a chisel bar, a drift pin and a set of hand drills. In the more important stations, pipe cutters and threading machines and dies and stocks for bolts can be added. At such stations, a work bench and vise are desirable. Miscellaneous tools, such as hand axes, lanterns, oilers, shovels, jacks, sledges, grinders, dollies and block and tackle may be provided if local conditions warrant.

Where the pumper can make such repairs, a considerable saving of the time of the repair gang, and more than a corresponding saving in the cost of maintaining the water station, can be made by providing tools that are adapted to the needs of the particular plant. Furthermore, most pumpers are better satisfied and take a deeper interest in this work if they are allowed to feel this added responsibility for the condition of the equipment in their charge.

Providing Tools Encourages Local Maintenance

By E. M. Grime

Engineer of Water Service, Northern Pacific, St. Paul

The tools and other equipment with which a water station should be furnished, depend so largely on the amount and kind of supervision that is provided, as well as the type of operator available, that it seems impracticable to lay down a definite rule to be followed under all conditions.

There are, no doubt, thousands of water stations where the only tools provided are hammer, chisel and combination wrench, and where the water service repairman expects to go at the least sign of trouble. At these places, the pumper has so little ability or ambition that he does not know how to handle good tools if they are provided, and is not expected to do much more than to tighten up a leaky joint or make the most simple adjustment to the engine or pump. As soon as anything goes wrong, this type of man is helpless and immediately calls for the repairman. He is frequently an old man, or a partially crippled one, recruited from some other part of the maintenance service and about ready to be retired, or else is the only man available in the community who can get along with the small stipend usually allowed for this kind of work.

On the other hand, a place as pumper frequently is taken by a young man who has little education but a liking for machinery and who is ambitious to get into steady railway employment, hoping in due time to be promoted to water service foreman or repairman on the division. A man of this type should be encouraged to keep his plant in such good repair that it will seldom be necessary to send the water service repairman there. While this man usually provides himself with all necessary small tools, his wages are low and it is only fair that the company provide him with the common tools which he is constantly in need of, if the machinery is to be kept in good shape.

In such a case the minimum that should be provided is about as follows:

1 12-in. Stillson wrench.
1 24-in. Stillson wrench.
1 Socket wrench to fit nuts on packing gland of triplex pumps, if such are in use.
1 10-in. Crescent wrench.
1 Set open end wrenches, 3/8-in. to 1-in.
1 Small bench vise—combination type for machinists and pipe fitters—weight about 50 lb.

A belt tightener may also be provided if there are several belts requiring considerable attention.

The amount of money invested in this way for tools may amount to a considerable sum on an entire railroad, but it saves an incalculable, though certainly a large amount, in ordinary maintenance, by enabling the water service foreman to devote most of his time to the more essential details of the service, instead of having to run continually after small jobs which can be taken care of more readily by the intelligent pumper who is provided with a fair assortment of tools and is encouraged to act on his own initiative.

Training for Bridge Inspectors

Should bridge inspectors be selected from the division bridge gangs or is technical training a requisite for this position?

Technical Training Essential for Steel Bridges

By I. L. Simmons

Bridge Engineer, Chicago, Rock Island & Pacific, Chicago

It is assumed that the question refers to ordinary maintenance inspection and not to inspection during construction, and the answer is based on this assumption. A capable inspector, whose duties cover timber and pile bridges only, can usually be selected from the division bridge gangs, since a technical training is seldom or never required on this class of work. In fact, the practical experience possessed by a good bridge carpenter is usually an asset that is superior to any amount of technical training, without experience, for this particular position.

When it comes to steel bridges or other structures of steel, a technical training becomes a matter of prime necessity, whether the inspection is to be made by the division forces or by inspectors working directly under the bridge engineer. On this class of work, too many questions of a technical nature are certain to arise to permit a man who has not had the advantage of a technical training to be wholly dependable in all situations.

The division engineer or some member of his staff who can qualify in this respect should be made directly responsible for the condition and inspection of the steel structures on the division. As a check on this local inspection, however, it should be supplemented by a

periodic inspection by system inspectors who not only have a technical education but are also especially trained for this purpose.

On construction work, including the construction of permanent structures other than steel, the inspectors should not be recruited from the division forces. To handle this type of inspection properly, a technical knowledge is also highly desirable, and technical men do not usually start in bridge gangs.

Technical Training Not Necessary

By R. A. Van Ness
System Bridge Engineer, Atchison, Topeka & Santa Fe, Chicago

In order to answer this question in the light of the practice on the Santa Fe, the procedure which is followed in making the bridge inspection on this road should be stated. A regular system inspection is not made. An annual inspection is made, however, by the division officers, including the superintendent, the division engineer, the general foreman of bridges and buildings, and such other members of his staff as the superintendent may designate. Throughout the year the general foreman makes frequent examinations of the structures under his jurisdiction. Where the importance of the structures or other conditions warrant, the general foremen have bridge inspectors who go over the division and inspect all the bridges at least once every month. These inspectors are either picked from the bridge gangs or are chosen from among the foremen.

It is considered that this procedure insures that the bridges are kept under constant supervision, and that they receive at least one technical inspection every year. Any unusual condition which is found to exist is immediately called to the attention of the system bridge engineer. In view of this system of inspection, it is not considered that technical training is a requisite for the position of bridge inspectors as they are designated on the Santa Fe.

Methods of Weed Control

What can be done to retard or prevent a heavy growth of weeds on the right of way?

Repeated Mowing Will Kill Weeds

By A. Chinn
Engineer Maintenance of Way, Chicago, Burlington & Quincy, Lincoln, Neb.

Keeping weeds down on the right of way is a problem of long standing that cannot be solved by any formula. The best method of bringing about this desired result is by cutting the weeds persistently and regularly. Where this practice is followed, the only other important item to be determined is the cheapest method of doing the work.

The old method of hand mowing with scythes is not only expensive, but it takes the section forces off the track at a time when this work can be done to best advantage. To reduce the cost of weed control and release the laborers for other work, most roads now cut the right of way with horse-drawn farm mowers, wherever possible. This confines the use of hand labor to such areas as are irregular in contour and cannot be taken care of by any other method. Experience has shown that horse-drawn mowers will do the work for approximately half the cost of hand mowing.

In many sections of the country it has been found that, if the right of way is mowed regularly, the weeds will disappear eventually and a good stand of grass will take their place. Quite often the adjoining land owners are willing to cut the grass for the privilege of gathering the hay. In this way the right of way is kept mowed at practically no cost to the railroad.

Mowing Is the Only Satisfactory Way

By T. Thompson
Roadmaster, Atchison, Topeka & Santa Fe, Joliet, Ill.

The only successful method in the territory with which I am familiar is to mow the weeds before they have an opportunity to go to seed. If this is done consistently, year after year, the weeds will be eradicated and replaced by a clean stand of desirable grasses. Where it is practical to do so, it is advisable to allow the grass to seed before cutting, as this will hasten the departure of the weeds and make it more difficult for them to return.

Mowing Is the Best Method

By Roadmaster

Preventing or even reducing the heavy growth of weeds which frequently occur on the right of way is a difficult problem at best and, in some cases, even the most extreme measures fail to give satisfactory results.

Where weeds occur in the ballast or within the limits of the roadbed, either burning or the application of weed-destroying chemicals is recognized as the most effective and economical method of weed control. It is obvious, however, that neither of these methods is adapted for general use over the area outside the limits of the roadbed. It is equally obvious that the growth of most varieties of weeds and grasses can be controlled, in part at least, if they are not allowed to go to seed. This is not true of a few varieties, such as the Bermuda and Johnson grasses, which give endless trouble in some sections, and which require special treatment. No better means of preventing seeding has been devised than that of cutting before maturity.

In using this method, however, several problems arise: How often and when shall the mowing be done; how can it be done most quickly and economically; and shall the right of way be burned after each mowing?

The frequency and time of cutting will depend in large measure on the character of the vegetation and the climatic conditions. In the northern sections, less frequent mowing is necessary than in the far southern territory, with its longer growing season and generally more rapid growth. In some sections a single cutting will suffice, while in others several cuttings are required. In some instances, the first cutting makes it possible for an entirely different crop to spring up. The writer recalls the case of a road which had cut the right of way once a year, with very unsatisfactory results. It was decided to try two mowings, one earlier than had been the custom and one at a later date. One result of this policy was a complete change in the type of weeds growing on the right of way.

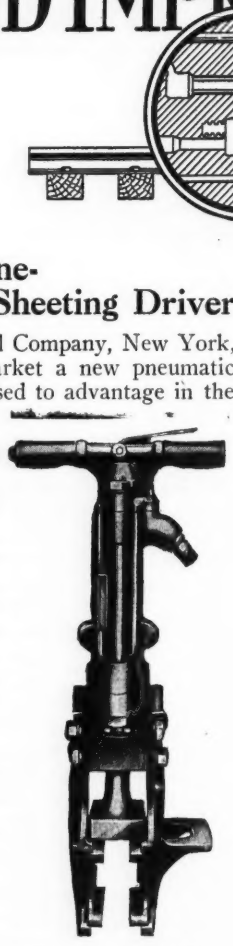
In many sections, particularly in the middle west and other prairie states, regular cutting of the weeds will eventually result in a good stand of grass, thus improving the appearance of the right of way and reducing the cost of weed control. Where the right of way is suitable for cultivation, the adjacent land owner is often glad to cultivate the right of way and thus prevent the spread of the weeds to his own property.

Hand mowing should be avoided wherever possible, because of its cost and also because of the disturbance it causes to the season's program of track-work. If the condition of the ground permits the use of a mowing machine, the cost can often be reduced to 25 or even 20 per cent of the cost of doing the work by hand.

New And Improved Devices

A New Pneumatic One-Man Sheeting Driver

THE Chicago Pneumatic Tool Company, New York, has recently put on the market a new pneumatic sheeting driver, which can be used to advantage in the driving of sheet piling in all classes of trench work and excavation where the ground formation is such that the sheeting will penetrate without breaking. This new driver, which is known as the CP-116 sheeting driver, is essentially the same as the CP-116 demolition tool with a special front end; and while it is designed primarily to drive wood sheeting, it is also adapted for driving light steel sheet piling. The new driver is of the valveless type, with only one moving part—the piston. It weighs 105 lb., and is well-balanced, features which make it readily portable and adapted for operation by one man. It is said that it is low in air consumption and has no tendency to freeze in even the coldest weather.



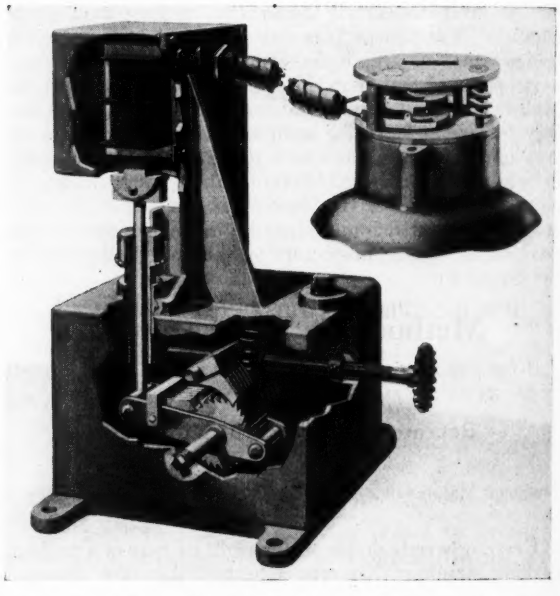
The New CP-116 Sheeting Driver

The new sheeting driver is regularly furnished with two guide plates, one with a step and one without, but it can be furnished with a pair of either kind of plates if so specified. Adjusting plates adapt the driver to various sizes of sheeting, from 1½ in. to 2½ in. thick. The omission of adjusting plates gives a 3¼-in. opening for driving 3-in. sheeting. The handle of the driver can be assembled either parallel to the sheeting or at right angles to it, and by changing only the front end the driver can be converted into a demolition tool. It is said that the driver, depending upon conditions, will do the work of from 8 to 10 men with mauls.

A New Electro-Magnetic Chemical Proportioner

THE Paige & Jones Chemical Company, Inc., New York, has recently developed an electro-magnetic chemical proportioner for use in connection with lime-soda water softeners, which is automatic in operation, and said to control the volume of chemicals fed to the water with a high degree of accuracy. This new proportioner, which consists of a unit about six inches high and with a base about four inches on a side, consists essentially of a solenoid, which receives electrical impulses from a water meter in a raw-water line and translates these impulses into mechanical motion, which, in turn, regulates the chemical proportioner, and, therefore, the amount of chemical which is fed to the water. Through this arrangement the chemical introduced into the raw water is always in direct proportion to the quantity of raw water being treated.

In this new device, two simple fibre cams, shaped like ratchet wheels with coarse teeth, are attached one above the other on one of the shafts of the water meter in the raw-water line. Bearing on these two cams are two springs provided with contact points for opening and closing an electrical circuit. Both of the cams are



The New Proportioner Stands Only Six Inches High

identical, but staggered in relation to each other on the shaft, so that when the end of the contact-spring of the lower cam reaches the depression in that cam it will drop abruptly and make contact with the spring of the upper cam, closing an electrical circuit until the spring of the upper cam reaches the depression in that cam, when the circuit is abruptly broken. Through this arrangement the number of makes and breaks in the circuit is directly proportional to the number of revolutions of the meter shaft and, therefore, to the amount of water passing through the meter.

The electrical impulses at the water meter are translated into mechanical motion to regulate the chemical feed by the electro-magnet in the new proportioner. Each time the circuit is completed, the solenoid of the unit is energized, causing the armature of the solenoid to be drawn upward. An extension of the armature is connected to a rocker arm with a pawl, which, in

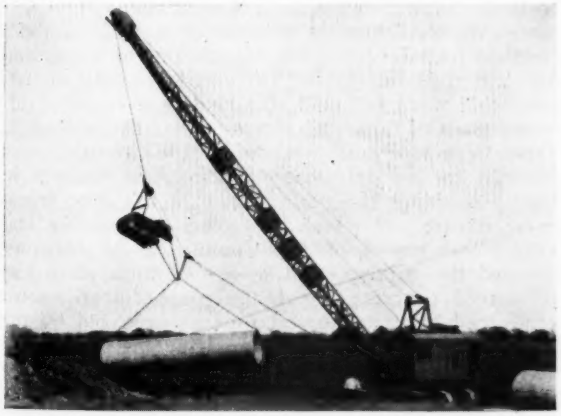
turn, engages a ratchet wheel. This ratchet wheel actuates a sprocket located on the outside of the case through a worm and sector, and a chain connecting the sprocket with the swivel takeoff pipe in the chemical tank translates the motion to the takeoff pipe, which, as it is raised and lowered, skims the proper amount of chemicals from the top of the solution. A vernier is provided which regulates the stroke of the armature and, therefore, the movement of the ratchet wheel and makes possible the accurate adjustment of the chemical feed to water of any hardness.

The solenoid of the proportioner is located in a sealed bronze box, and all of the working parts are encased in an oil-tight bronze housing filled with oil. The entire assembly of the proportioner is located at the ground leel, avoiding the necessity of climbing to the top of the reaction tank for oiling or inspection. The new proportioner, which is said to be equally adapted to cold, semi-hot and hot process machines, has an electrical consumption of one kilowatt-hour in 285 hours, or, under average conditions, one kilowatt-hour per 12 days, operating 24 hours a day.

Northwest Brings Out New Model

THE Northwest Engineering Company has announced the development of a new crawler type crane, to be known as Model 7, which is designed primarily for dragline work, but which is adapted for every form of railway maintenance within its capacity.

This machine, which is equipped normally with a 50-ft. boom and 1¾ cu. yd. dragline bucket, is mounted on an unusually stable base, 11 ft. 6 in. wide, with crawlers having an over-all length of 16 ft. 4 in. The positive traction, a patented feature, assures the utmost



Northwest Model 7 Placing a Corrugated Pipe Culvert.

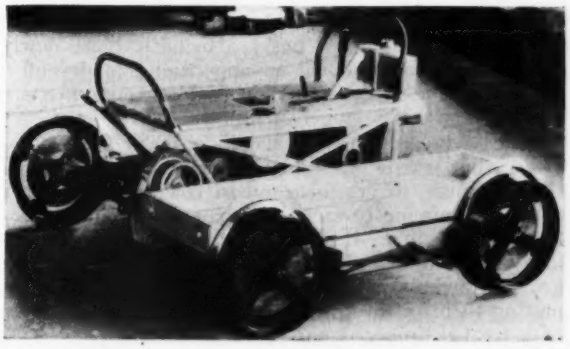
mobility, whether over difficult ground, or when working from a flat car or in a scrap yard.

It is equipped with Northwest variable-speed, accelerator-controlled motor, which permits rapid acceleration at the touch of a lever, thus giving the operator increased speed in the same manner as with an automobile engine, which, under many conditions, results in an increase of 15 to 20 per cent in the output of the machine. Other features include a revolving fair-lead, "feather-touch" control, helical drive gear, and ball bearings on all high-speed shafts.

The Model 7 is convertible to a standard crane by simply removing or changing buckets, or it can be used for trenching by changing booms. It is adapted particularly for ditching work, and has the advantage that it can be operated with equal facility from the ground or from a flat car. Despite its large capacity, it can be loaded on a flat car and shipped to any point without dismantling, other than taking down the boom.

Fairmont Improves Inspection Car

FAIRMONT Railway Motors, Inc., has redesigned its Model MM9 inspection car for the purpose of incorporating a number of new features, among which the most outstanding are improvements in the wheel construction. The new wheels have tires of electric steel of high manganese content, which are said to be made so tough by heat treatment that the flange can be bent back flat with the tread without fracture. It is said also that 30 torpedoes in a row were unable to deform a tire of this type. These rims are mounted on four-spoke wheel centers or spiders, enabling the rims to be changed readily without disturbing the mountings of the wheels on the axles. A new feature of the four-spoke malleable wheel spiders is a safety disc on the inner side which prevents material on the car from working into the wheel.



The New MM9 Inspection Car

In the revised design of this car, the engine is started, without pushing the car, by a long starting crank supported in an outboard bearing on the left side. It is said that the engine balance has been improved by careful testing and that all vertical engine vibration has been eliminated from the seat. The four-wheel brake is controlled by a separate lever which may be hooked in a set position to hold the car stationary during pauses for inspection.

Where considerable material must be carried, long trays can be furnished at nominal extra cost. Either one or two trays may be used. The size illustrated is 50½ in. by 15½ in. by 3 in. inside, but a 35¼-in. length is also made. Another change has been to extend the seat four inches farther back while the rear safety rail is now made of aluminum instead of steel so it may be used as a handle when setting the car on and off the track, the back end having been found to be so light that few operators use the extension easy-lift levers except in soft ballast.



How One Railway Advertises

What Our Readers Think

Handling Creosoted Ties

Detroit, Mich.

TO THE EDITOR:

There is a constant hue and cry on the part of our membership in connection with the handling of creosoted ties and bridge timbers. You are probably familiar with the disagreeable nature of this work. It ruins the men's clothing, injures their hands and faces and is particularly offensive if it gets into their eyes as it oftens does in the summer when the men are perspiring freely. When creosoted ties (particularly those newly treated that have not had an opportunity to dry off), are sent to the section gangs in coal cars, the men are in more than usual danger of injury.

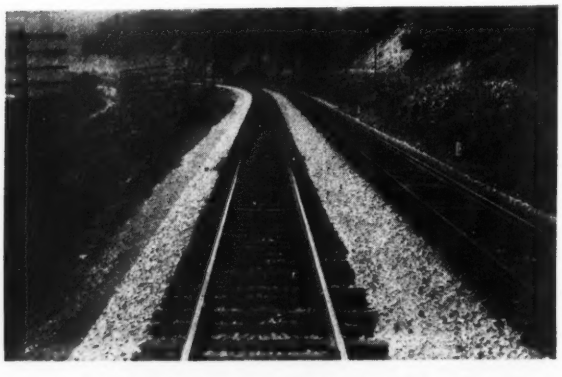
The tie hooks used for handling these treated ties often slip when men are lifting them, sometimes shoulder high, to get them out of coal cars. We are, in fact, continuously faced with complaints in connection with the many disagreeable features met in working with creosoted timber. After the ties are on the ground there is not so much danger of injury when putting them in the track, but any work in connection with treated timber is objectionable.

When creosoted ties are placed in a coal car immediately after being treated, the creosote dripping off the ties creates a very slippery and hazardous condition in the bottom of the cars. In addition to the increased hazards created by this condition, our men complain of their shoes being ruined and of skin injuries resulting to their feet.

We believe that railway managements are doing a great deal to eliminate hazards. We also feel that the physical comfort and welfare of the men are being given consideration. Yet, the handling of creosoted timbers is causing our men considerable trouble and our brotherhood receives more complaints on account of this condition than from any other.

I am wondering whether *Railway Engineering and Maintenance* has ever made a study of this problem and whether you or your readers have any suggestions which we might transmit to our membership as to improvements that might be made or methods that might be followed in an effort to eliminate the hazard and the disagreeable features of this work.

L. E. KELLER,
Statistician, Brotherhood of Maintenance of Way Employees.



Reconstructed Tracks on the Erie Near Waverly, N. Y., Where This Railroad Has Laid Its First 130-lb. Rail

New Books

Proceedings of the American Wood Preservers' Association for 1923. 336 pages, illustrated, 6 inches by 9 inches, bound in cloth, published by the Association, 228 North LaSalle Street, Chicago.

Like its predecessors this volume constitutes a comprehensive progress report of current developments in the field of wood preservation. The subject matter of the reports and papers presented is divided between statements of progress on scientific research and reports of service tests, etc. Among papers of unusual interest or particular practical value to railway men are: A report on Termites (wood destroying ants) by Dr. Thomas E. Snyder, a paper on Timber Treatment on the Illinois Central by A. F. Blaess and another on Creosoted Timber in Ballast Deck Bridges by Dr. Herman von Schrenk.

Proceedings of the American Railway Engineering Association.—Vol. 30, 1929. 6 in. by 9 in. 1,507 pages, illustrated. Bound in cloth. Published by the association, E. H. Fritch, secretary, 431 South Dearborn Street, Chicago.

The annual proceedings of the American Railway Engineering Association for 1929 contain a comprehensive report of the activities of the association during 1928, together with the reports of 24 regular committees and 4 special committees presented at the convention last March.

Among the reports of special interest was that of the Committee on Ties which supplemented its previous reports on anti-splitting devices and the size of holes for pre-boring for spikes with further data. It also outlined the results of its inspection of concrete ties in service on the Pennsylvania. The Committee on Rail, besides presenting statistics on rail failures, included valuable reports on the cause and prevention of rail batter, the reconditioning of battered and worn rail ends, the economic value of different sizes of rails, and service tests of intermediate manganese steel rails. Considerable attention was devoted to the detection of transverse fissures in track, including the performance of the new transverse fissure car which was placed in service last year. The report of the Committee on Masonry covered the principles of design of both plain and reinforced concrete, the tentative specifications for reinforced concrete culvert pipe as prepared by the joint concrete culvert pipe committee, the science and art of concrete manufacture, and the waterproofing of railway bridge decks. A large part of the report of the Committee on Economics of Railway Labor dealt with the methods of securing greater efficiency and economy in the use of labor-saving devices in track maintenance and gave performance and cost records from various railways for different types of roadway machines.

Contrary to the usual practice, the 12 monographs which were published in various bulletins during the year were not reprinted in the proceedings, in order to obviate the necessity of two volumes.

ONE HUNDRED YEARS AGO.—On August 8, 1829, the Delaware & Hudson Canal Company completed a private gravity railway between Honesdale, Pa., and Carbondale, 16½ miles, and made a test run with the "Stourbridge Lion," one of four imported from England, and the first steam locomotive to be tried out in actual use in this country.

WITH THE ASSOCIATIONS



American Railway Engineering Association

W. C. Cushing, charter member and past president of the association has been elected to honorary membership by the board of direction in recognition of his long and valuable service to the association. Mr. Cushing is the sixth man to receive this recognition in the thirty years of the association's history.

Roadmasters Association

Every indication points to an attendance at the forty-seventh annual convention exceeding that of any previous meeting. This convention will be held at the Hotel Stevens, Chicago, on September 17-19. The program is as follows:

Tuesday, September 17

10:00 a. m. Convention called to order.
Invocation by A. M. Clough, past president.

10:15 a. m. Opening address by W. F. Thiehoff, general manager, Chicago, Burlington & Quincy Railroad.

10:40 a. m. Address by President H. R. Clarke.
Appointment of special committees.

11:00 a. m. Report of committee on The Training and Selection of Track Foremen, G. T. Donahue, chairman, assistant division engineer, New York Central Railroad, Rochester, New York.

12:30 p. m. Adjournment.

2:00 p. m. Address on Recent Developments in the Detection of transverse Fissures in Rails, by Chas. W. Gennet, Jr., vice-president, Sperry Rail Service Corporation, Chicago.

2:45 p. m. Report of Committee on The Detection and Correction of Unsafe Methods in Track Work, G. H. Warfel, chairman, assistant to general manager, Union Pacific System, Omaha, Nebraska.

3:30 p. m. Address on The Stabilization of Maintenance of Way Forces, by H. S. Clarke, engineer maintenance of way, Delaware & Hudson Railway, Albany, New York.

4:30 p. m. Adjournment to visit exhibit of Track Supply Association.

8:00 p. m. Moving pictures illustrating modern methods in track work.

Wednesday, September 18

9:30 a. m. Report of Committee on Methods and Cost of Weed Control and Elimination, A. Chinn, chairman, district engineer, maintenance of way, Chicago, Burlington & Quincy Railroad, Lincoln, Nebraska.

10:30 a. m. Address on The New Day in Maintenance, by R. H. Ford, assistant chief engineer, Chicago, Rock Island & Pacific Railroad, Chicago.

11:30 a. m. Address on The Production and Care of Cross Ties, by R. S. Belcher, manager treating plants, Atchison, Topeka & Santa Fe System, Topeka, Kan.

12:30 p. m. Adjournment.

2:00 p. m. Report of Committee to Develop Standards of Good Workmanship in Laying Rails and Recommend Methods of Insuring Adherence to Those Standards, C. W. Baldridge, chairman, assistant engineer, Atchison, Topeka & Santa Fe System, Chicago.

3:00 p. m. Address on Getting the Most from Labor Saving Equipment, by M. M. Backus, assistant chief engineer maintenance of way, Illinois Central System, Chicago.

4:00 p. m. Adjournment to visit exhibit of Track Supply Association.

6:30 p. m. Annual dinner of the Track Supply Association and the Roadmasters' Association. Address by L. A. Downs, president, Illinois Central Railway System, Chicago.

Thursday, September 19

9:30 a. m. Report of Committee on Methods of Determining and Controlling Cross and Switch Tie Renewals, L. M. Denny, chairman, supervisor, Cleveland, Cincinnati, Chicago & St. Louis Railway, Indianapolis, Indiana.

10:30 a. m. Business session.
Reports of officers and of committees.
Election of officers.
Selection of 1930 convention city.
New business.
Installation of officers.
Adjournment.

12:45 p. m. Special train leaves LaSalle Street Station on New York Central for Indiana Harbor, Indiana, where lunch will be served by the Inland Steel Company, following which the members will be shown through the mills of this company and given an opportunity to observe the rolling of rails, joints and tie plates and the making of bolts and spikes. The train will reach LaSalle Street station on the return trip at 5 o'clock (daylight saving time).

Track Supply Association

In addition to the 64 firms which were reported in the August issue as having taken membership and made reservations for space in the exhibit of the Track Supply Association which will be presented at the Stevens Hotel, Chicago, on September 17-19 in connection with the convention of the Roadmasters and Maintenance of Way Association, the following firms have also arranged for space.

Chicago Steel Foundry Company.
Dilworth, Porter & Co., Inc., Pittsburgh, Pa.
National Carbide Sales Corporation, New York City.

Bridge and Building Supply Men's Association

Although six weeks remain before the Bridge and Building Supply Men's Association will present its exhibit in connection with the convention of the American Railway Bridge and Building Association at New Orleans, La., on October 15-17, thirty companies have already arranged for space, including the following:

American Hoist & Derrick Company, St. Paul, Minn.
American Rolling Mill Company, Middletown, Ohio.
Carter Bloxonend Flooring Company, Kansas City, Mo.
Celotex Company, Chicago.
Chicago Bridge & Iron Works, Chicago.
Dearborn Chemical Company, Chicago.
Paul Dickinson, Inc., Chicago.
Duff-Norton Manufacturing Company, Pittsburgh, Pa.
Fairbanks Morse & Co., Chicago.
Fairmont Railway Motors, Inc., Fairmont, Minn.
High Grade Manufacturing Company, Cleveland, Ohio.
Ingersoll Rand Company, New York City.
Ingot Iron Railway Products Company, Middletown, Ohio.
Johns-Manville Corporation, New York City.
Jones Paint Company, Rome, N. Y.
The Lehon Company, Chicago.
Lewis Asphalt Engineering Corporation, New York City.
Massey Concrete Products Company, Chicago.
Murdock Manufacturing and Supply Company, Cincinnati, Ohio.
National Lead Company, New York City.
Joseph E. Nelson & Sons Company, Chicago.
Northwestern Motor Company, Eau Claire, Wis.
Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.
Pittsburgh Plate Glass Company, Newark, N. J.
Pocket List of Railroad Officials, New York City.
H. H. Robertson Company, Pittsburgh, Pa.
Wm. Robertson & Co., Chicago.
Sherwin Williams Company, Cleveland, Ohio.
Railway Engineering and Maintenance, Chicago.
U. S. Wind Engine and Pump Company, Batavia, Ill.

RAILWAY NEWS BRIEFLY TOLD



The Missouri Public Service Commission has asked the railways to cooperate in making a survey of all the highway crossings in the state, to be used as a basis for a future grade-crossing elimination program. It is estimated that there are approximately 10,000 grade crossings in the state.

The Pennsylvania has built eight cars at its Altoona shops, for use in its suburban service between Philadelphia, Pa., and Paoli, employing aluminum alloy superstructures, except for the belt rails which are made of steel, thus reducing the weight of the cars by 13,200 pounds each.

Employees of the Missouri & North Arkansas have recently entered a group insurance plan, under a policy issued by the Prudential Insurance Company of America, the total amount involving $921,000 covers 635 lives. The policies, which also cover disability and accidental death, range from $1,000 to $10,000.

The record freight traffic movement so far this year has been handled with fewer freight cars and locomotives than at any time since 1923. The present freight car ownership of the Class I railroads, excluding railroad-controlled private refrigerator cars, totals 2,266,069, a reduction of 98,603 cars under the greatest number of cars ever owned, which was in September, 1925.

The Nashville, Chattanooga & St. Louis has filed a tariff of reduced passenger rates with the Railroad and Public Utilities Commission of Tennessee, in order to make a test of the effect of the lower rates. The new tariff reduces the fare between Nashville, Tenn., and Memphis by $3.58, between Nashville and Jackson, $2.21, and between Jackson and Memphis, $1.08.

The Institute of Economics of the Brookings Institution, after a study of the economic aspects of the proposed St. Lawrence waterway, has found that this project cannot be justified from an economic viewpoint. The total cost of the project is estimated to be $999,000,000, in addition to which the development of the potential power available in the lower St. Lawrence is estimated to cost $225,000,000.

The Chicago, Rock Island & Pacific, in conjunction with 19 cities and towns in Arkansas, Oklahoma and Texas, has organized to combat the malaria mosquito, following the unusual wet weather which has visited nearly all sections of the Southwest this summer. The campaign is being carried out through the medical and operating departments of the railroad. The measures employed include the use of oil and, where the nuisance is particularly bad, provide for draining on an extensive scale. The work on the ground is under the direction of H. W. VanHovenberg, consulting sanitary engineer of the Rock Island and his assistants.

The Pennsylvania, following conferences between officers of the road and a committee of the Pennsylvania System Fraternity, has arranged to put an eight-hour day into effect beginning August 16, for track employees. This includes not only foremen and laborers, but track walkers, carpenters and plumbers. For work over eight hours in any one day, time and one-half will be allowed.

The Denver & Salt Lake is contending, in a suit before the Federal district court at Denver, that the use of the Moffat tunnel is not worth more to that road than the present rental. The original estimate of the cost of constructing this tunnel was $6,720,000, whereas, owing to construction difficulties, the completed cost was $17,813,973. The Denver & Salt Lake signed a lease in which the rental was based on the estimated cost of construction, providing for the use of a tunnel by the railway for a period of 50 years from January 7, 1926. The present suit is brought by the railway to enjoin the Moffat Tunnel Commission from canceling the present lease for the purpose of collecting higher rentals, based on the actual cost.

Railway Records

Revenue freight car loadings continue to establish new high records on the railways of the United States. During the four weeks ending August 10, the latest for which data are available, these loadings totaled 4,374,565 cars as compared with 4,161,258 cars for the same period last year and 4,130,959 cars for the corresponding weeks of 1927. Likewise, gross and net earnings are showing marked increases, the railway operating revenues of the Class I railways for June totaling $531,748,136, an increase of $28,591,197 over those for the same month last year, while net railway operating income showed an even greater increase, being $105,961,315 for the month or 22 per cent higher than for June, 1928.

A unique protest has been made against the construction of the Hudson Bay Railway by the Indians at York Factory, Man. During a two-days' council, which is held annually following treaty payments, the Canadian government paying agent was requested officially to stop the construction of the railway on the ground that the occupation of Ft. Churchill will drive the white foxes, which are the chief source of the Indians' subsistence, away from the coast region of Hudson Bay.

For a number of years the Pennsylvania has stimulated the purchase of its stock by employees through an arrangement whereby shares of Pennsylvania stock can be purchased through the company on the installment plan. Twenty-seven thousand employees have just completed their payments on shares purchased under this plan and now take their places as full-fledged stockholders of the company. About 66,000 other employees, who have purchased stock, have not yet completed their payments.

Owing to the marked increase in the speed of freight trains on the Missouri Pacific, it has been found necessary to rearrange the facilities which this road provides for resting, feeding and reconsigning of the sheep and cattle moving into Kansas City from the Southwest. As a result, new pens have been constructed at Prospect, Mo., which replace similar pens at Leeds, Mo., and Osawatomie, Kan. The sheep unloading pens have a capacity for 200 carloads, while the capacity of the cattle feeding facilities is 98 cars.

All train service on the Denver & Salt Lake through the Moffat tunnel was suspended on July 25, when the track was blocked by earth and rock which fell after a section of the timber lining failed 2,000 ft. in from East Portal. Additional falls occurred on July 26; a total of 500 cu. yd. of earth and rock covered the tracks, while 75 ft. of timbering required replacement. The failure of the timbering was attributed to dry rot. Trains were detoured over the old line until July 30, when the track was cleared and the timbering replaced.

Construction News

The Abilene & Southern has applied to the Interstate Commerce Commission for authority to construct an extension from Ballinger, Tex., to San Angelo, 39 miles.

The Arkansas Western has let a contract to Williams & McWilliamson for the grading for an extension from Waldron, Ark., 23.5 miles southeast. The total estimated cost of this line is $420,000.

The Atchison, Topeka & Santa Fe has awarded a contract to the List Construction Company, Kansas City, Mo., for the construction of an extension between Parsano, Tex., and Presidio, 73 miles. The work covered by the contract also includes the construction of buildings and the placing of culverts. This extension will connect the old Kansas City, Mexico & Orient lines in the United States and Mexico.

A contract has been let to M. R. Stauffer, Newton, Kan., for the construction of a two-story brick and reinforced concrete station at Newton.

Bids were closed by this company August 19, for the construction of an addition to its hospital at Topeka, Kan.

The Canadian National has let contracts for the grading and installation of culverts for 261 miles of branch lines in Alberta and Saskatchewan and bids have been received or have been requested for the construction of 227 more miles of branch lines in Alberta, Saskatchewan, Nova Scotia and Prince Edward Island. The contracts already let are as follows: Melfort, Sask., to Aberdeen, 89 miles, to Stewart & Cameron, Winnipeg, Man., estimated cost, $2,800,000; Central Butte, Sask., to a point 50 miles southwest near Turnhill, to W. A. Dutton, Winnipeg, estimated cost, $1,800,000; Neidpath, Sask., to the Canadian Pacific near Swift Current, 31 miles, to the Western Construction Company and Gibbs Brothers, North Battleford, Sask., estimated cost, $1,200,000; Unity, Sask., southwest 50 miles to a point near the Saskatchewan-Alberta border, to the Brooks Construction Company, Prince Albert, Sask., estimated cost, $1,750,000; Hemaruka, Alta., to Scapa, 41 miles, to Foley Brothers, Ltd., Winnipeg, estimated cost, $1,435,000. The proposed lines for which bids are requested are as follows: Hamlin, Sask., to Glenbush, 33 miles, estimated cost, $1,150,000, bids were closed on July 22; St. Walburg, Sask., to Bonnyville, Alta., 117 miles, estimated cost, $4,212,000, bids were closed on July 22; Sunnybrae, N. S., to Guysborough, 67 miles, estimated cost, $3,500,000, bids to be requested in September; Lake Verde, P. E. I., to Pisquid, 10 miles, estimated cost, $370,000.

The Canadian Pacific has let a contract to the F. W. Miller Heating Company, for the installation of a boiler washing system and a direct steaming system to serve the 32 stalls of a new enginehouse at John street, Toronto, Ont. The direct steaming equipment has been designed by the Railway Engineering Equipment Company, Chicago.

A contract has been awarded to the Sidney E. Junkins Co., Limited, Vancouver, B. C., for the construction of a steel bridge over the Nicola river to replace the present structure. The new bridge, which will be approximately 318 ft. long and about 20 ft. higher than the existing structure, will consist of three deck plate girder spans on concrete piers and abutments. The contract for grading the new approaches has been let to Ellis Cotton, Limited.

The Chesapeake & Ohio has awarded a contract to the John W. Cowper Company, Richmond, Va., for the enlargement and rearrangement of its locomotive terminal facilities at Hinton, W. Va. The improvements will include extensions to seven stalls of the present enginehouse, a new 800-ton capacity concrete coaling station, two concrete inspection pits, two locomotive washing platforms, electrically operated cinder conveyors and a new coal conveyor. A number of new buildings will be constructed, including an arch-brick storage building with concrete platform, sand house, foreman's office building, locomotive supply building and ice house, all of which will be of concrete and brick construction, except the arch-brick storage building and sand house, which will be of steel construction. The cost of these improvements will be approximately $265,000.

1,100 Miles of New Lines Feature of Month

The feature of the August construction news is the large mileage of new lines contemplated. In Canada and the western states projects involving the construction of approximately 1,100 miles of new lines, at a cost of more than $43,000,000, the details of which are given in adjoining columns, were announced or placed under contract during the month. The authorization of other construction has also continued at a high level, the Pennsylvania alone having authorized or let contracts for projects during the month that will aggregate upward of $55,000,000, and still other work is contemplated. Two union station projects, one announced and the other for which preliminary contracts were let, will cost more than $40,000,000. In addition, the total cost of other miscellaneous projects involving the construction of buildings, bridges, freight terminal facilities and line and grade revision, announced or placed under contract, exceed $25,000,000.

The Chicago & North Western has awarded a contract to the H. A. Peters Company, Chicago, for the construction of a one-story and basement brick and concrete fireproof oil storage building at its Chicago avenue shops, Chicago. The building, which will have outside dimensions of 50 ft. by 150 ft. and will involve a total expenditure of $150,000, will serve as an oil distributing station for the entire railway.

This company has awarded a contract to the Roberts & Schaefer Company, Chicago, for the construction of a multiple track electric cinder handling plant at Council Bluffs, Iowa.

The Cincinnati Union Terminals has let a contract for the grading for the site of the new terminal project in the Mill creek bottoms at Cincinnati, O., to the Winston Brothers Company, Minneapolis, Minn. This work involves the placing of 6,000,000 cu. yd. of earth.

The Elizabeth Southern has applied to the Interstate Commerce Commission for permission to construct a new line from Elizabeth, La., to Kinder, about 40 miles. If built, this line will connect with the Santa Fe at Elizabeth and with the Gulf Coast Lines at its southern terminal.

The Great Northern has amended its application for authority to construct a line into Northern California, to provide for a route from Klamath Falls, Ore., through the Klamath Valley and Tule Lake district to a terminal at or near Bieber, Cal., to meet a proposed extension of the Western Pacific. The revised line will have a route mileage of 87½. This company also plans to file an application with the Interstate Commerce Commission for permission to extend its proposed branch line from Richey, Mont., to Hamblin, 32 miles, an additional 73 miles west to Jordan, a total of 105 miles. In addition to reaching a section of Montana, which is now without adequate transportation facilities, the proposed line will serve as part of a secondary main line to cross Montana, which it is planned to complete within the near future.

This company and the Western Pacific have applied jointly to the Interstate Commerce Commission for authority to acquire and construct a 36-mile line from Lookout, Modoc county, Cal., to a connection with the McCloud River railroad at Hambone, Siskiyou county, Cal.

The Illinois Central has let a contract to W. C. Salley of Monroe, La., for the construction of a one-story brick and concrete passenger station at Monroe. This project will cost about $100,000, and the building will have outside dimensions of 28 ft. by 123 ft. while a brick platform will be 500 ft. long and 15 ft wide.

The Los Angeles & Salt Lake has been authorized by the Interstate Commerce Commission to construct a branch line, extending easterly approximately 22 miles, from a point about

seven miles south of Las Vegas, Nev., to serve the Boulder Canyon region. It is estimated that the project will involve an expenditure of about $840,000.

The Missouri Pacific has purchased land between Commerce and Rector streets and Fourth street and Capitol avenue at Little Rock, Ark., for the construction of a freight station which, with attendant facilities will involve an expenditure of about $1,000,000.

Contracts have been let to the Winston Brothers Company, Minneapolis, Minn., and the List Construction Company, Kansas City, Mo., for the construction of a second main track between Eureka, Mo., and Lake Hill, 10.4 miles. This project will involve a total expenditure of about $4,350,000.

This company plans the immediate expenditure of about $9,000,000 for grade and line revision on its Central Kansas division between Osawatomie, Kan., and Hoisington on the line between Kansas City, Mo., and Pueblo, Col. The improvement includes eight projects with a total of 38.4 miles of track on which the maximum grade will be 0.7 per cent and the maximum curvature of 2 deg. 30 min. A section between Rapp, Kan., and Admire, 8.7 miles, and another between Allen, Kan. and Council Grove, 16 miles, will be completely relocated. It is expected that the entire project will be completed by July, 1930.

A contract has been awarded to the Roberts & Schaefer Company, Chicago, for the construction of a reinforced concrete RandS shallow pit automatic electric locomotive coaling plant and an "N. & W." type electric cinder plant to be built at Durand, Kan.

The New Orleans, Texas & Mexico has made application to the Interstate Commerce Commission for permission to construct a line between Baton Rouge, La., and New Orleans.

The Northern Pacific has awarded a contract to E. J. Dunnigan, St. Paul, Minn., for the construction of a double-track cut-off around the yard at Laurel, Mont., to cost $175,000. The same contractor has been awarded a contract for the reconstruction and lengthening of a bridge near Allard, Mont., at a cost of about $65,000. A contract has also been let to Carl Steen, Grand Forks, N. D., for the construction of a brick passenger station and restaurant building at Mandan, N. D., at a cost of $150,000.

The Oaxaca & Pacific has been formed to construct a railroad between Ejutla, Oax., and Puerto Angel on the Pacific ocean, about 80 miles. The line will connect with the National of Mexico at Ejutla and extend from that point southeast to Miahuatlan, and thence south to Puerto Angel.

The Pennsylvania has awarded contracts for construction work on its lines totaling $3,044,000, as follows: To the Bethlehem Steel Company, Bethlehem, Pa., for the furnishing and erection of a lift span, towers and approach spans for its passenger line bridge over the Hackensack river at Marion, N. J., to cost $1,445,000; to the Phoenix Bridge Company, Phoenixville, Pa., for the furnishing and erection of a lift span, towers and approach spans for a freight line bridge at the same location to cost about $670,000; to Senior & Palmer, Inc., N. Y., for masonry work on the west approach to the passenger bridge at Marion, N. J., to cost about $576,000; to J. Rich Steers, Inc., New York, for masonry work on the east approach for both the freight and passenger line bridges at the same location, estimated to cost $150,000; to the McKelvy-Hine Company, Pittsburgh, Pa., for the construction of an underpass to eliminate a highway grade crossing at Salem, O., to cost about $82,000; to the Stillman-Delehanty-Ferris Company, Jersey City, N. J., for the renewing of the deck on a portion of the stock yards pier at Jersey City, N. J., at an expenditure of about $71,000; and to the T. J. Foley Company, Pittsburgh, Pa., for the reconstruction of an overhead highway bridge west of Coatesville, Pa., to cost about $50,000.

A permit has been issued by the city and work has already started on the piling for the first unit of this company's new $50,000,000 rail-ship terminal on the North river in Jersey City, N. J. The terminal, when completed will consist of three connected warehouse units and three piers extending into the river. The three units will be connected at the front, and the entire warehouse will be surrounded by concrete drives. The building will be of reinforced concrete, brick and terra cotta construction. Bids will be received soon for the construction of the first unit and one of the piers.

This company has awarded construction contracts totaling $297,000 as follows: To the Ferguson & Edmondson Company, Pittsburgh, Pa., for the construction of a bridge over the Allegheny river at Oil City, Pa., to cost $132,000; to the S. & M. Contracting Company, Chicago, for track elevation over Seventy-ninth street, to cost $65,000; to the Arthur McMullen Company, New York, for the construction of an underpass and lateral highway to eliminate two grade crossings at Phelps, N. Y., to cost $57,000; to Walter S. Rae, Pittsburgh, Pa., for the renewal of a portion of the street approach to overhead bridge to Hovis Island stock yards at Thirtieth street, Pittsburgh, at an expenditure of $43,000.

The Pittsburgh & West Virginia has applied to the Interstate Commerce Commission for a certificate authorizing the construction of an extension from its Connellsville extension, now under construction, from Pigeon Creek Crossing to Baird, Pa., 5.77 miles, to connect with the Donora Southern and afford an entrance to the Donora industrial district.

The Port Everglades Terminal which will be built by the Broward County Port authority has awarded a contract to the Bryan & Halloway Construction Company, Inc., West Palm Beach, Fla., for the construction of a new line 4½ miles long, extending from the municipal piers at Port Everglades, Fla., and crossing the Seaboard Air Line and Florida East Coast.

The St. Louis Southwestern has let a contract to Winston Brothers, St. Louis, Mo., for the construction of a new line between Gideon, Mo., and Deering, 20 miles.

The San Antonio & Aransas Pass, a subsidiary of the Southern Pacific, has applied to the Interstate Commerce Commission for authority to construct a 1.5-mile line near the Houston Ship Channel in Houston, Tex.

The San Antonio, Uvalde & Gulf has awarded a contract to William A. Smith, Houston, Tex., for the construction of a branch line from Brundage, Tex., to a point five miles south. The estimated cost of the construction of this extension is $61,700.

The Santa Fe, San Juan & Northern has applied to the Interstate Commerce Commission for permission to build an extension from Tilden, N. M., to Cuba, about 12 miles, at an estimated cost of $133,114.

The Southern Pacific has awarded a contract to the Granite Construction Company, Watsonville, Cal., for the grading for the construction of a double-track extension from Watsonville Junction, Cal., to Logan Quarry, at a cost of $55,000.

This company is planning the construction of an employees' tuberculosis sanitarium at Tucson, Ariz., to cost $200,000.

The Tulsa Union Depot Company will construct a union depot at Tulsa, Okla., on a site to be purchased from the St. Louis-San Francisco, the depot to be leased jointly by that railway, the Missouri-Kansas-Texas and the Atchison, Topeka & Santa Fe. The cost of the site and terminal building is not to exceed $1,500,000.

The Wabash has contracted with the Roberts & Schaefer Company, Chicago, for the installation of an "N. & W." type multiple track electric cinder plant at Landers, Ill.

Bids will soon be accepted for a 120-ft. reinforced concrete double track bridge over Kingshighway, northwest of St. Louis, Mo.

The Western Pacific has applied to the Interstate Commerce Commission for authority to construct a 3¼ mile branch line from Hart, Cal., to Disappointment Slough to serve a beet sugar factory.

The Yates & West Texas has applied to the Interstate Commerce Commission for authority to build a line from a connection with the Kansas City, Mexico & Orient, near Rankin, Tex., south and southeastward 43 miles to Sheffield. Examiner M. S. Jameson of the commission has recommended that the application be approved.

Supply Trade News

The Ingersoll-Rand Company has moved its Chicago office to the Daily News building, 400 W. Madison street.

The Orton Crane and Shovel Company has appointed **Thomas D. Crowley**, Chicago, its special railway sales representative in the United States.

The American Hoist & Derrick Company, St. Paul, Minn., has established a branch office at 5800 Bingham avenue, Detroit, Mich., which will be in charge of **G. J. Heck.**

The Harnischfeger Sales Corporation has awarded a contract to the Memphis Construction Company, covering the construction of a one-story factory branch, storage and distributing plant at Memphis, Tenn.

The offices of the **Curtin-Howe Corporation** have been moved to 415 Lexington avenue, New York. This company has also opened a Chicago offiee at 448 Wrigley Building, with **F. S. Shinn** in charge.

The Morrison Railway Supply Corporation, Buffalo, N. Y., is constructing a plant at Chicago for reconditioning switch points, cropping rails and manufacturing welding rods and has opened an office at 1534 McCormick building in that city. This company has taken over the switch point and frog reclamation department of the Inter-State Car & Foundry Company, Indianapolis, Ind. Geo. V. Diver, president of the latter company, has also been appointed manager of the frog and switch division of the Morrison Railway Supply Corporation.

The Direct Steaming Company of Canada, Limited, Kingston, Ont., has been formed under a Canadian charter to install direct steaming systems and related power plant equipment at locomotive terminals in Canada under an agreement with the Railway Engineering Equipment Company, Chicago. **William Casey**, vice-president and general manager of the Canadian Locomotive Company, has also been elected president of the new company. Other officers are **S. C. Holland**, vice-president and general manager of the R. W. Mitchell Company, and **G. P. Bogert**, vice-president and general manager of the Dominion Oxygen Company, vice-presidents; **J. M. Hickey**, secretary, and **G. W. Daly**, treasurer. In addition to Mr. Casey, Mr. Holland and Mr. Bogert other members of the board of directors are **J. G. Forster**, vice-president, Ogle Construction Company, and **L. G. Plant**, president, Railway Engineering Equipment Company.

In order to promote and extend the use of Diesel power in America, 12 of the leading manufacturers of Diesel engines in the United States have organized the Diesel Engine Manufacturers' Association, with headquarters at 30 Church street, New York, with the object of promoting and extending the use of Diesel power in America. The present membership of the association includes the New London Ship & Engine Works; the Electric Boat Company; the Worthington Pump & Machinery Corporation; the Fulton Iron Works Company; the Ingersoll-Rand Company; Fairbanks, Morse & Co.; the Nordberg Manufacturing Company; I. P. Morris & De La Vergne, Inc.; the Winton Engine Company; the Cooper-Bessemer Corporation; the McIntosh & Seymour Corporation; Busch-Sulzer Bros.; the Diesel Engine Company; and the Hooven, Owens, Rentschler Company.

Henry R. Supthen, president of the Electric Boat Company, is president of the association; **E. T. Fishwick**, vice-president of the Worthington Pump & Machinery Corporation, is vice-president; and **Harlan A. Pratt**, manager of the oil and gas engine department of the Ingersoll-Rand Company, is secretary and treasurer. **M. J. Reed**, 30 Church street, is research engineer.

The sales department of the **Page Steel & Wire Company** has been moved from Bridgeport, Conn., to the American Bank Building, Pittsburgh, Pa. Sales of chain link fence will be handled by **R. J. Teeple**; field fence and general wire products by **S. B. Cairns**; welding wire and specialties by **J. J. Flaherty. W. T. Kyle**, general manager of sales of the company, has his headquarters at the general sales office, 230 Park avenue, New York City.

Personal

Beverly L. Sneed, contracting manager of the **Virginia Bridge and Iron Company**, has been elected vice-president to succeed **G. A. Tretter**, resigned.

E. J. Schwanhausser, assistant manager of the Harrison works of the **Worthington Pump and Machinery Corporation**, has been appointed manager of the Buffalo works.

Charles M. Easterly, president of the Capitol City Culvert Company, has been elected first vice-president of the **Canton Rolling Mills Corporation**, Canton, Ohio.

Fred M. Cross, manager of the pneumatic tool sales department in the Chicago office of the **Ingersoll-Rand Company**, has been promoted to assistant general manager of this department, with headquarters at 11 Broadway, New York. **D. W. Zimmerman** succeeds Mr. Cross in the Chicago office.

F. R. Cothran, chief engineer of the Piedmont & Northern, with headquarters at Charlotte, N. C., has resigned to become vice-president and general manager of the Beauharnois Construction Company, Beauharnois, Que.

G. A. Secor, district sales manager of the **Buda Company**, Harvey, Ill., with headquarters at St. Louis, Mo., has been promoted to sales manager with headquarters at Chicago, succeeding **J. L. Artmaier**, who has been granted a leave of absence.

Dr. Anson Hayes has been appointed director of research of the **American Rolling Mill Company**, Middletown, Ohio, in charge of all metallurgical research problems for the organization. He succeeds **W. J. Beck**, who has been appointed assistant to **Charles R. Hook**, general manager. Dr. Hayes, who graduated from Drake University in 1908, has been chief of the Chemical division of the Armco research division for the past year and a half.



Dr. Anson Hayes

Prior to that he held the chair of physical chemistry at Iowa State College for 12 years. He also taught graduate courses in thermo-dynamics and directed research work in the study of factors that influence the stability of iron carbide, particularly in white iron composition suitable for the manufacture of malleable iron.

Obituary

John D. Hurley, president of the **Independent Pneumatic Tool Company**, died at Chicago on August 15 following a sudden heart attack.

J. C. Ward, managing director of Edgar Allen & Co., Limited, Sheffield, England, and a director of the Edgar Allen Steel Company, Inc., New York, died August 8. He was at one time president of the Edgar Allen Steel Company and a former president of the American Manganese Steel Company, Chicago.

Luther B. McMillan, consulting engineer of the **Johns-Manville Corporation**, New York, died in a hospital August 10, from the effect of injuries received in an airplane accident near the municipal airport at Newark, N. J. Mr. McMillan was born at Bern, Mo., September 21, 1891, and graduated from the Texas Agricultural and Mechanical College in 1911. He was awarded a fellowship at the College of Engineering at the University of Wisconsin and was an instructor in that institution for two years. He entered the service of the Johns-Manville Corportion in 1916, and remained until the time of his death.

Personal Mention

O. H. Beasley, chief land appraiser in the valuation department of the Norfolk & Western, and an engineer by training and experience, has been promoted to real estate agent to succeed **John F. Snyder,** retired. Mr. Beasley was born at Lynchburg, Va., on August 25, 1893, and received his education at Virginia Military Institute, graduating in civil engineering in 1915. He was employed by the DuPont Powder Company as transitman, and in 1916 entered the service of the Southern in the engineering department. On his return from overseas in 1918, where he attained the rank of captain during the World War, he became engaged in the real estate business in Washington, D. C. From 1921 to 1922, he was associated with the bureau of valuation of the Interstate Commerce Commission. In 1923 he returned to railway service as land appraiser for the Chesapeake & Ohio. He left the service of this road in 1925 to accept a similar position with the St. Louis-San Francisco. Mr. Beasley entered the service of the Norfolk & Western on October 1, 1927, as chief land appraiser, in which position he remained until July 1, the date of his promotion.

John Callaghan, general manager and chief engineer of the Alberta & Great Waterways, the Edmonton, Dunvegan & British Columbia and the LaCombe & Northwestern, with headquarters at Edmonton, Alta., until those roads were taken over by the Canadian Pacific and the Canadian National, has been appointed general manager of the Northern Alberta, which has been newly organized to operate these three roads, with headquarters at Edmonton. Mr. Callaghan was born on May 5, 1868, in Iowa, and from 1889 to 1894 was engaged in location and construction on various railways in Oregon, Washington and British Columbia. From 1895 to 1900, he was with the Canadian Pacific on location and construction, principally on its western lines, and from 1901 to 1903 was engaged in similar work with the Great Northern in Montana and British Columbia. In 1904 he returned to the Canadian Pacific and from 1905 to 1909, he was in charge of reconnoissance and location on the lines west of Winnipeg. In 1910, he went with Foley, Welch & Stewart, contractors, who were engaged in railway work in Western Canada, and a year later, he was placed in charge of location and construction on the Mountain division of the Grand Trunk Pacific, now a part of the Canadian National. In the following year he was made chief engineer of the Pacific Great Eastern and later of the Calgary & Southwestern. In June, 1919, he became superintendent for Stewart & Welch, railway contractors, at Calgary, Alta., and in 1921 was made general manager of the Alberta & Great Waterways and the LaCombe & Northwestern, and later also of the Edmonton, Dunvegan & Pacific.

Engineering

H. B. Reinsagen, principal assistant engineer of the New York Central Lines West of Buffalo, N. Y., has been promoted to assistant chief engineer, with headquarters as before at Cleveland.

A. F. Randolph, assistant to the division engineer of the Middle division of the Pennsylvania, has been appointed engineer in the office of the chief engineer maintenance of way, with headquarters at Philadelphia, Pa.

J. C. Bousfield, at one time division engineer of the Detroit terminal of the Wabash and recently in charge of the construction of the Wabash Union Produce Terminal at Detroit, Mich., has been appointed construction engineer of the Wabash, with headquarters at St. Louis, Mo.

Frank P. Jennings, assistant engineer on the Central Vermont, with headquarters at St. Albans, Vt., has been transferred to the Canadian National Railways, with headquarters at Montreal, Que., Canada, where he will be in charge of survey parties in connection wth the building of the new Montreal passenger terminal.

J. A. McKenzie, transitman on the Canadian Pacific at London, Ont., has been promoted to division engineer of the Montreal Terminals division, succeeding **J. H. Forbes,** who has been promoted to assistant district engineer of the Quebec district, to replace **J. H. Reeder,** whose promotion to general tie agent is noted elsewhere in this issue.

A. A. Miller, who has been on leave of absence, has resumed his duties as engineer maintenance of way of the Missouri Pacific. **W. H. Vance,** who has been acting engineer maintenance of way, during his absence has returned to his former position of assistant engineer maintenance of way. The headquarters of both offices are at St. Louis, Mo.

L. J. Drumeller, whose promotion to division engineer on the Chesapeake & Ohio, with headquarters at Hinton, W. Va., was noted in the August issue, was born on September 13, 1897, at Richmond, Va. He entered railway service on July 15, 1915, as a rodman on the Eastern General division of the Chesapeake & Ohio, and on August 15, 1917, he was promoted to instrumentman on the Huntington division. On February 16, 1918, he left the service of the Chesapeake & Ohio to become an instrumentman on the Louisville & Nashville, with headquarters at Irvin, Ky., and from April to July of that same year he served as a draftsman on the Missouri Pacific with headquarters at St. Louis, Mo. From July 16, 1918, to January 1, 1919, he served with the United States Army at Fort Monroe, Va., and on the latter date returned to the C. & O. as an instrumentman with headquarters at Ashland, Ky. On June 15, 1920, he was promoted to assistant division engineer of the Chicago division and on May 16, 1921, he was appointed computer with headquarters at Richmond, Va. On March 1, 1922, he again left the Chesapeake & Ohio to serve as assistant engineer for the International Nickel Company, Huntington, W. Va., and on October 1, 1922, he went with the Island Creek Railway Company in the same capacity, with headquarters at Holden, W. Va. On September 1, 1923, he again returned to the Chesapeake & Ohio, as an assistant engineer with headquarters at Huntington, and on July 15, 1925, he was appointed assistant division engineer with headquarters at Richmond. On April 15, 1927, he was transferred to Russell, Ky., where he was located at the time of his recent promotion to division engineer.

Track

Michael F. Keefe, supervisor of track on the New York Central at Moira, N. Y., since 1918, has retired after 54 years of service with that road.

Tony Zanger has been appointed roadmaster on the Northern Pacific, with headquarters at Spokane, Wash., succeeding **Andrew Larson,** who has been granted a leave of absence.

J. T. Stallings, roadway supervisor on the Mobile & Ohio at Citronelle, Ala., has been promoted to roadmaster, with headquarters at Murphysboro, Ill., to succeed **L. C. Arnold,** who has been appointed roadway supervisor at Citronelle.

J. Strachan, engineer in the office of the division engineer of the Edmonton division of the Canadian National at Edmonton, Alta., has been promoted to roadmaster on the same division, with headquarters in the same city, to succeed **A. Ramstand,** transferred.

H. S. Chandler has been appointed supervisor of track on the Rivanna subdivision of the Richmond division of the Chesapeake & Ohio, with headquarters at Richmond, Va., succeeding **J. W. Knapp, Jr.,** whose promotion to assistant division engineer was noted in the August issue.

H. E. Blair, extra gang foreman on the Canadian Pacific at Trenton, Ont., has been appointed to roadmaster on the Ontario division at Kingston, Ont., to succeed **O. Donnelly,** who has been retired on a pension. **Ernest Bornaio,** extra gang foreman and relieving roadmaster, has been promoted to roadmaster on the Quebec district at Three Rivers, Que., succeeding **W. M. Bell,** who has been transferred to the Ontario district at Trenton, Ont., where he takes the place of **George Spicer,** who has been retired on a pension. **S. Kurzaba** has been appointed roadmas-

ter on the Alberta division at Stirling, Alta., succeeding **C. Johnson,** who has been transferred to Lomond, Alta., to succeed **E. Desharnais,** who has been retired on a pension.

P. C. Smedley, supervisor of division No. 5 of the Long Island, with headquarters at Hicksville, N. Y., has been transferred to division No. 2, with headquarters at Jamaica, N. Y., to succeed **Jos. Summers,** who has been transferred to the New York division of the Pennsylvania, with headquarters at Jersey City, N. J.

Thomas Forward, roadmaster on the Michigan Central, with headquarters at Jackson, Mich., has been retired after 46 years service. He started his service as a section laborer in 1883 and was made foreman two years later. He remained in this position until 1910 when he was promoted to assistant roadmaster at Jackson. His promotion to roadmaster at the same place occurred in 1916, and he remained in this position until his recent retirement.

D. J. Hovland, assistant roadmaster on the Wisconsin division of the Chicago & North Western, has been appointed roadmaster on the same division, with headquarters at Harvard, Ill., succeeding **William J. Wilkinson,** who was retired August 1, after 58 years of service. Mr. Hovland was born in Norway on Feb. 27, 1882, but received his education in the public schools of this country. He entered the service of the Chicago & North Western on May 1, 1899, and continued until April, 1902, as a section laborer. From the latter date until June, 1918, he was alternately section foreman and extra gang foreman on the Northern Iowa and Sioux City divisions. From June, 1918, until August 1, 1929, he served as assistant roadmaster on the Wisconsin division.

Changes on the Pennsylvania

H. L. Pierce, supervisor on the Cresson division, has been transferred to the bridge department in the office of the chief engineer with headquarters at Pittsburgh, Pa. **G. A. Williams,** assistant supervisor at Chester, Pa., has been promoted to supervisor with headquarters at Lock Haven, Pa., succeeding **L. E. Gingerich,** who has been transferred to Middletown, Pa. **Carl E. Backus,** assistant on the engineering corps of the Logansport division has been appointed assistant supervisor with headquarters at Camden, N. J., to succeed **H. F. Gette,** who has been transferred to Altoona, Pa., where he in turn will succeed **P. M. Roeper,** who has been transferred to Chester, Pa., to replace Mr. Williams. **Kirk A. Werden,** assistant on the engineering corps of the Chicago Terminal division has been appointed assistant supervisor with headquarters at York, Pa., succeeding **A. J. Greenough,** who has been transferred to South Philadelphia to relieve **E. F. Lang,** who has been transferred to Wilmington, Del., where he will in turn replace **T. H. Thomas** who has been promoted to supervisor with headquarters at Cresson, Pa., succeeding Mr. Pierce. **Clifton B. McFarland,** assistant on engineer corps of the Grand Rapids division has been appointed to assistant supervisor with headquarters at Hollidaysburg, Pa., to succeed **F. D. Pitts,** who has been transferred to Columbia, Pa. **Clayton R. Uitts,** assistant on engineer corps of the Chicago Terminal division has been appointed assistant supervisor with headquarters at Pottsville, Pa. **J B. Jones,** assistant on engineer corps of the Logansport division has been appointed assistant supervisor with headquarters at Chambersburg, Pa.

A. J. Schaller, general foreman on the Pittsburgh division of the Pennsylvania has been promoted to assistant supervisor of the same division, with headquarters at Pittsburgh, to succeed **I. S. Braumagin,** whose transfer to the Eastern division was noted in the August issue.

C. W. Robinson, assistant on the engineering corps of the Pittsburgh division, has been promoted to assistant supervisor on the Buffalo division, succeeding **F. E. Flynn,** who has been transferred to the Pittsburgh division, with headquarters at Trafford, Pa. Mr. Flynn replaces **C. H. Kooser,** who has been promoted to supervisor on the Monongahela division, with headquarters at Monongahela, Pa., to relieve **F. M. Oyler,** who has been transferred to the Pittsburgh division, with headquarters at Gallitzin, Pa., to succeed **C. F. Miller,** who has been promoted to assistant division engineer on the Eastern division. **M. C. Dempsy,** assistant on the engineering corps of the Eastern division, has been appointed assistant supervisor on the Conemaugh division, with headquarters at New Kensington, Pa., to succeed **G. D. Markert,** who has been transferred to Carnegie, Pa., on the Panhandle division. Mr. Markert succeeds **J. P. Newell,** who has been promoted to supervisor on the Buffalo division, with headquarters at East Aurora, N. Y., to succeed **H. J. Kerstetter,** who has been transferred to the Conemaugh division, with headquarters at Sharpsburg, Pa., to replace **B. M. Frymire,** who has been assigned to special duty on the Pittsburgh division.

M. H. LaRouche, whose promotion to supervisor on the New York Central, with headquarters at Moira, N. Y., was noted in the August issue, was born on January 28, 1888, at Williamstown, N. Y., and graduated from the Assumption Academy, at Utica, N. Y., in June, 1906. He entered railway service on February 1, 1907, with the New York Central as chief clerk to the supervisor at Carthage, N. Y., and from May 1, 1915, until September 25, 1916, he served as assistant foreman, foreman and extra gang foreman on the same territory with the same headquarters. On September 25, 1916, he was promoted to general foreman with headquarters at Gouverneur, N. Y., and on June 1, 1917, was again made extra gang foreman at Carthage. On February 2, 1919, he was promoted to assistant supervisor of track with the same headquarters, and on April 1, 1923, was transferred to Syracuse, N. Y., where he was located at the time of his recent promotion to supervisor at Moira, N. Y.

Bridge and Building

Robert McKibben, master carpenter on the Pennsylvania, with headquarters at Altoona, has been transferred to Cruson, Pa.

A. D. Shreve, general building foreman on the New York, New Haven & Hartford, with headquarters at Providence, R. I., has been retired on a pension.

R. B. Hennessy has been appointed bridge engineer of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., succeeding **Ralph E. Miller,** whose death was noted in the August issue.

P. R. Benton, assistant master carpenter on the Baltimore division of the Pennsylvania, with headquarters at Baltimore, Md., has been promoted to master carpenter on the Elmira division, with headquarters at Elmira, N. Y.

C. E. Teeter, general foreman of water service on the St. Louis-San Francisco at Springfield, Mo., has been retired on account of ill health after 36 years of service.

W. S. Miller has been appointed supervisor of bridges and buildings of the Third division of the Oregon-Washington Railroad & Navigation Company, with headquarters at Walla Walla, Wash., to succeed **J. Mendenhall,** who has been transferred.

W. Z. Gahman, assistant master carpenter on the Pittsburgh division of the Pennsylvania, has been promoted to master carpenter of the Renova division, with headquarters at Erie, Pa., to succeed **A. R. DeWalt,** who has been transferred to the Cleveland division, with headquarters at Cleveland, Ohio, succeeding **E. A. Roberts,** who has been transferred to the Eastern division, with headquarters at Alliance, Ohio. Mr. Roberts replaces **W. G. Kemmerer,** whose promotion to assistant engineer in the office of the chief engineer maintenance of way of the Western region at Chicago, was noted in the August issue.

Purchasing and Stores

W. E. F. Kirk, division storekeeper of the Atchison, Topeka & Santa Fe at Ottawa, Kan., has been promoted to general lumber supervisor at Topeka, Kan., and is succeeded by **A. B. Sears,** storekeeper at Waynoka, Okla.

H. L. Taylor, who has been promoted to purchasing agent of the Western region of the Canadian National, with headquarters at Vancouver, B. C., has been connected with that railway for 19 years. He entered railway service in July, 1906, in the freight station of the Canadian Northern (now

part of the Canadian National) at Winnipeg, Man., where he remained until 1912 when he entered the purchasing department of the MacKenzie Mann Construction Company, Winnipeg. In 1916 Mr. Taylor was appointed assistant purchasing agent of the Canadian Northern, with headquarters at Winnipeg, retaining this position when the Canadian Northern was absorbed by the Canadian National in 1920. He served as assistant purchasing agent at Winnipeg until his recent promotion to purchasing agent of the Western region.

J. H. Reeder, assistant district engineer of the Quebec district of the Canadian Pacific, with headquarters at Montreal, Que., has been promoted to general tie agent, with headquarters in the same city. **F. A. Cousins,** chief clerk and accountant in the tie department of this road at Montreal, has been appointed assistant general tie agent with the same headquarters.

F. W. Mahl, general purchasing agent of the Southern Pacific, with headquarters at San Francisco, Cal., after more than thirty years of service, has been granted a leave of absence pending retirement. The jurisdiction of **F. W. Taylor,** purchasing agent at San Francisco, has been extended to cover activities heretofore handled by the general purchasing agent.

Obituary

James M. Brown, assistant to the operating vice-president of the Chicago, Rock Island & Pacific, and for many years in the engineering department of that railway, died at Chicago on August 19. He was born April 15, 1860, at



James M. Brown.

Neiltown, Pa., and graduated from the engineering course at the University of Iowa. He entered the service of the Burlington, Cedar Rapids & Northern, now a part of the Rock Island, in 1879 and was successively engineer of construction, assistant engineer of maintenance of way, and division engineer on this road and the Chicago, Rock Island & Pacific, which absorbed the Burlington, Cedar Rapids & Northern. From August 22, 1905, to February 1, 1911, he was district engineer on the Rock Island, with headquarters at Davenport, Iowa. On the latter date he was promoted to engineer maintenance of way of the second district, and on November 1, 1918, to corporate engineer in charge of maintenance and construction. On March 1, 1920, he was promoted to assistant to the vice-president in charge of maintenance and construction, and in April, 1923, he was appointed assistant to the operating vice-president, a position which he held until the date of his death, August 19.

H. B. Walkem, who retired in 1920 as assistant engineer on the Canadian Pacific at Vancouver, B. C., died at Port Haney, B. C., on July 12, at the age of 70 years.

J. A. McM. Brown, roadmaster on the Canadian National with headquarters at Camrose, Alta., was instantly killed and a section foreman with whom he was riding on a speeder was injured, when they were struck by a train July 21, near Clover Bar, Alta.

George A. Mitchell, who retired from active service in 1925 as superintending engineer of bridges of the Central region of the Canadian National with headquarters at Toronto, Ont., died in that city on July 25. For more than 25 years previous to 1923, when he was appointed superintending engineer of bridges of the Canadian National, Mr. Mitchell had served at Toronto as master of bridges and buildings and superintendent of bridges and buildings of the Grand Trunk, now part of the former road, at Toronto.

Sherman Jordan, supervisor of track on the Franklin division of the New York Central, died during May of this year at the age of 64. He began his service with this road in 1890 as section foreman at Gerard, Pa. He was promoted to general foreman in 1903 and to assistant roadmaster two years later. In 1906 he was promoted to roadmaster on the Dunkirk, Allegheny Valley & Pittsburgh, and in 1909 was transferred to the New York Central, with headquarters at Sandusky,, Ohio. He was promoted to supervisor of track on the Franklin division and remained in this position until his death.

Ernest S. Mudge, valuation engineer of the Western lines of the Atchison, Topeka & Santa Fe, with headquarters at Amarillo, Tex., died on July 12 after an extended illness. Mr. Mudge had been connected with the Santa Fe for more than 35 years. He was born on June 9, 1874, at Brooklyn, N. Y., and spent his early life at Eskridge, Kan., and Manhattan. After attending the Kansas State Agricultural College from 1889 to 1891, he entered railway service in January, 1894, as a chainman on the Santa Fe at Newton, Kan. He was then promoted successively to rodman, transitman and assistant engineer and in 1907 he became division engineer at Wellington, Kan. Mr. Mudge was transferred to Amarillo in 1915 and in 1918 he was promoted to valuation engineer of the Western lines.

Thomas Rodd, retired chief engineer of the Pennsylvania and the Chicago Union Station, died at Pittsburgh, Pa., August 3. He was born in London, England, June 13, 1849, but came to the United States in 1856. He received his education in private and public schools and graduated from the United States Naval Academy in 1869, having served in the navy during the Civil war, from 1862 to 1865. Upon his graduation he was employed in the office of the city engineer at Philadelphia, Pa., remain-



Thomas Rodd

ing until 1872, when he entered the service of the Pennsylvania. From that date to 1889 he was successively rodman, assistant engineer, and principal assistant engineer. In June, 1889, he was promoted to chief engineer of the Pennsylvania Company, and also on January 1, 1901, to chief engineer of the Pennsylvania Lines West of Pittsburgh, a position he held until he retired from active service with this company in June, 1919. On November 24, 1913, he was also appointed chief engineer of the Chicago Union Station Company and served in this capacity to May 1, 1919. From this date until his retirement on May 1, 1927, he was consulting engineer of the Union Station Company. It was under Mr. Rodd's direction that the Union Station at Chicago was designed and construction started. Mr. Rodd was a charter member of the American Railway Engineering Association.

Charles B. Rogers, retired general manager of the Davenport, Rock Island & North Western, and a former roadmaster on the Chicago, Burlington & Quincy, died at Davenport, Iowa, August 19, after an extended illness. He was born on October 4, 1859, at West Point, Iowa, and entered the service of the Burlington in 1874 as a telegraph operator. He was successively station agent, roadmaster, and trainmaster on this road until 1915 when he resigned to become general manager of the St. Louis, Brownsville & Mexico. In 1918 he was appointed general manager of the Davenport, Rock Island & North Western, which position he held until his retirement in 1927.

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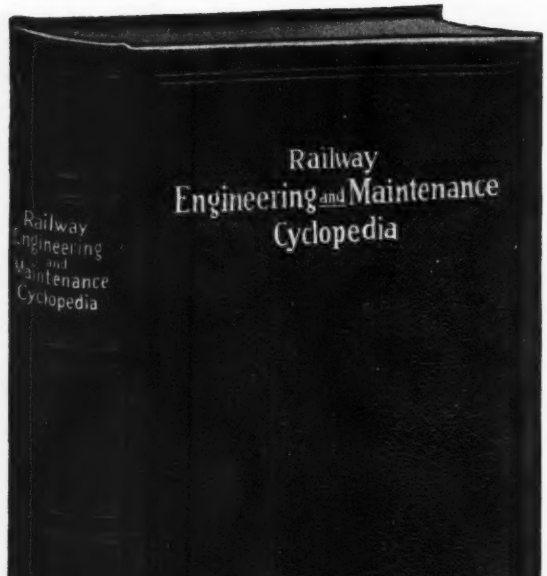
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Table of Contents

DEFINITION SECTION

Terminology of the A.R.E.A.
Terminology of the A.R.B. and B.A.
Terminology of the A.W.P.A.
Terminology of the Signal Section A.R.A.
General Subject Index
General Catalog Index

TRACK SECTION

Introduction
Roadway Standards
Grading and Grading Equipment
Drainage and Ditching Equipment
Snow and Ice Removal
Weed Destroyers
Ballast
Ballast Application and Cleaning
Ties
Rail
Rail Renewal and Maintenance
Rail Joints and Fastenings
Rail Joint Accessories
Tie Plates
Anti-Creepers
Switches, Frogs and Crossings
Guard Rails
Switch Stands
Bumpers and Car Stops
Derails
Fencing
Highway Crossings
Signs
Motor, Hand and Push Cars
Miscellaneous Tools and Equipment

BRIDGE SECTION

Introduction
Substructures
Piles
Pile Drivers and Accessories
Stone Masonry
Concrete Masonry
Concreting Equipment
Culverts
Superstructures
Bridge Floors
Waterproofing
Erection and Erecting Equipment
Bridge and Structural Painting
Turntables and Transfer Tables
Highway and Signal Bridges and Other Structures
Trestles

BUILDING SECTION

Introduction
Passenger Stations, Shelters and Platforms
Freight Houses and Equipment
Icing Stations
Locomotive Terminal and Shop Layouts
Engine Houses and Equipment
Fuel Stations, Sand Houses and Dryers
Ash Pits and Cinder Handling Equipment
Power Houses
Locomotive and Car Shops
Store Houses and Oil Houses
Standardized Buildings
Facilities for Housing Employees
Miscellaneous Roadway Buildings
Scales and Scale Test Cars
Foundations and Waterproofing
Floors
Walls and Partitions
Roofing, Flashings, Gutters and Spouting
Doors.
Windows and Skylights
Heating and Ventilating Equipment
Plumbing and Sanitary Equipment
Building Painting and Finishing
Electric Lighting Equipment.

WATER SERVICE SECTION

Introduction
Sources of Supply
Wells
Pumps
Power Units in Pumping
Pipe Lines
Pipe Joints and Fittings
Valves and Hydrants
Tanks
Water Columns
Water Treatment
Devices for Measuring Water
Tools and Equipment

SIGNAL SECTION

Symbols of the Signal Section, A.R.A.
Signals and Signal Indications
Automatic Block Signaling
Manual Block Signaling
Interlocking Plants
Mechanical and Electro-Mechanical Interlocking
Power Interlocking
Power Operation and Control at Classification Yards
Remote Control of Power Switches and Signals
Automatic Train Control
Highway Crossing Protection
Power Supply Systems
Power Distribution Systems
Track Circuits
Signal Accessories
Tools and Equipment

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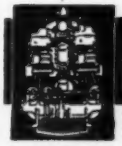
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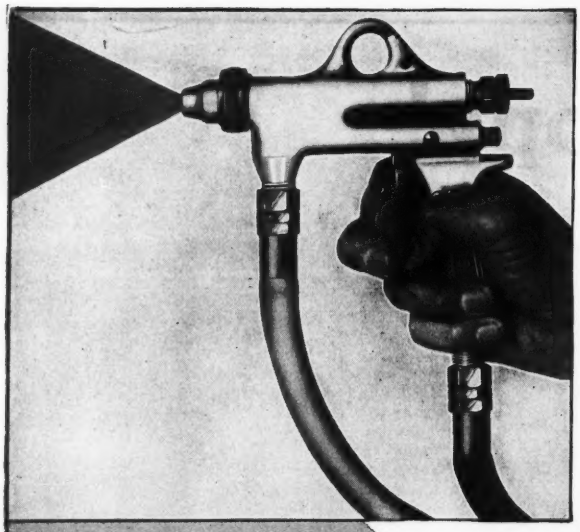
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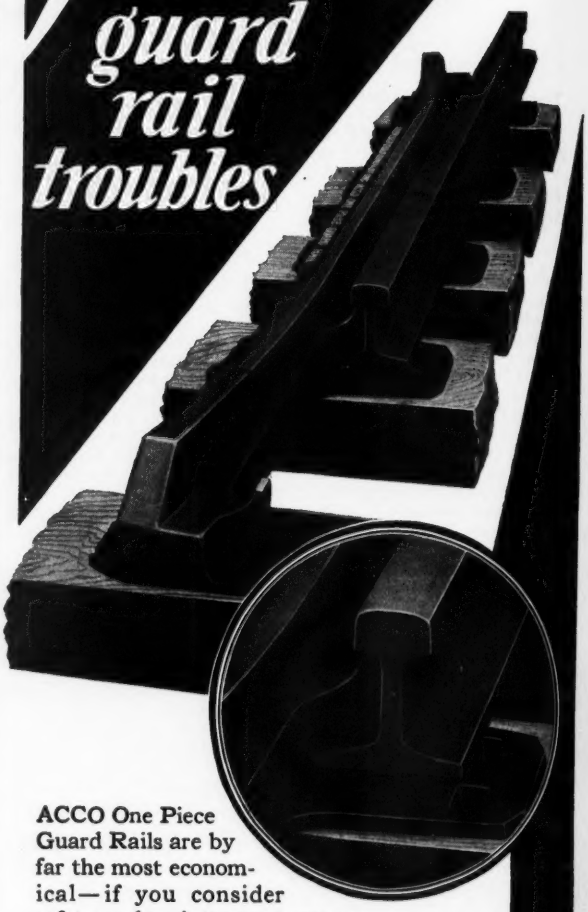
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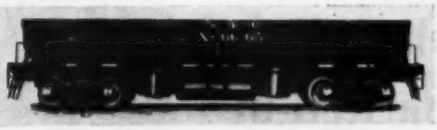
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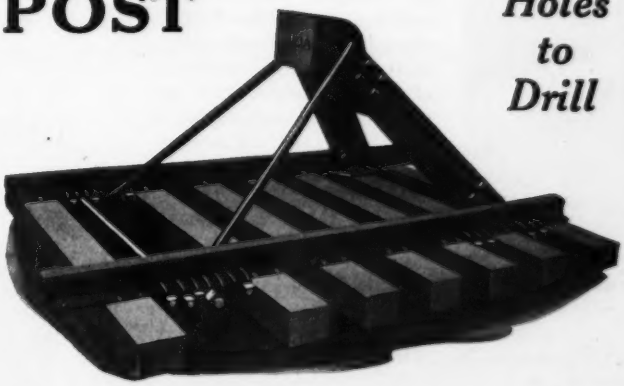
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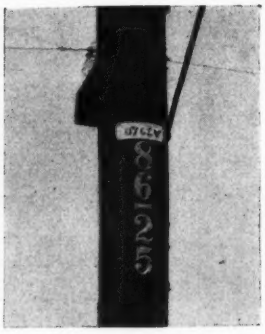


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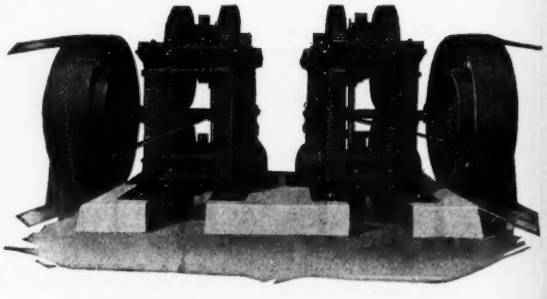
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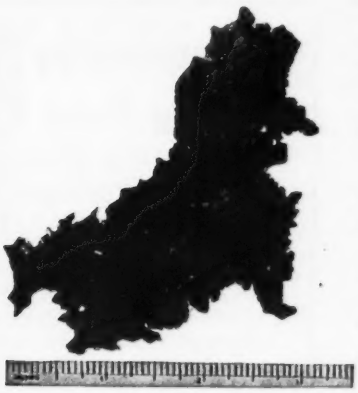
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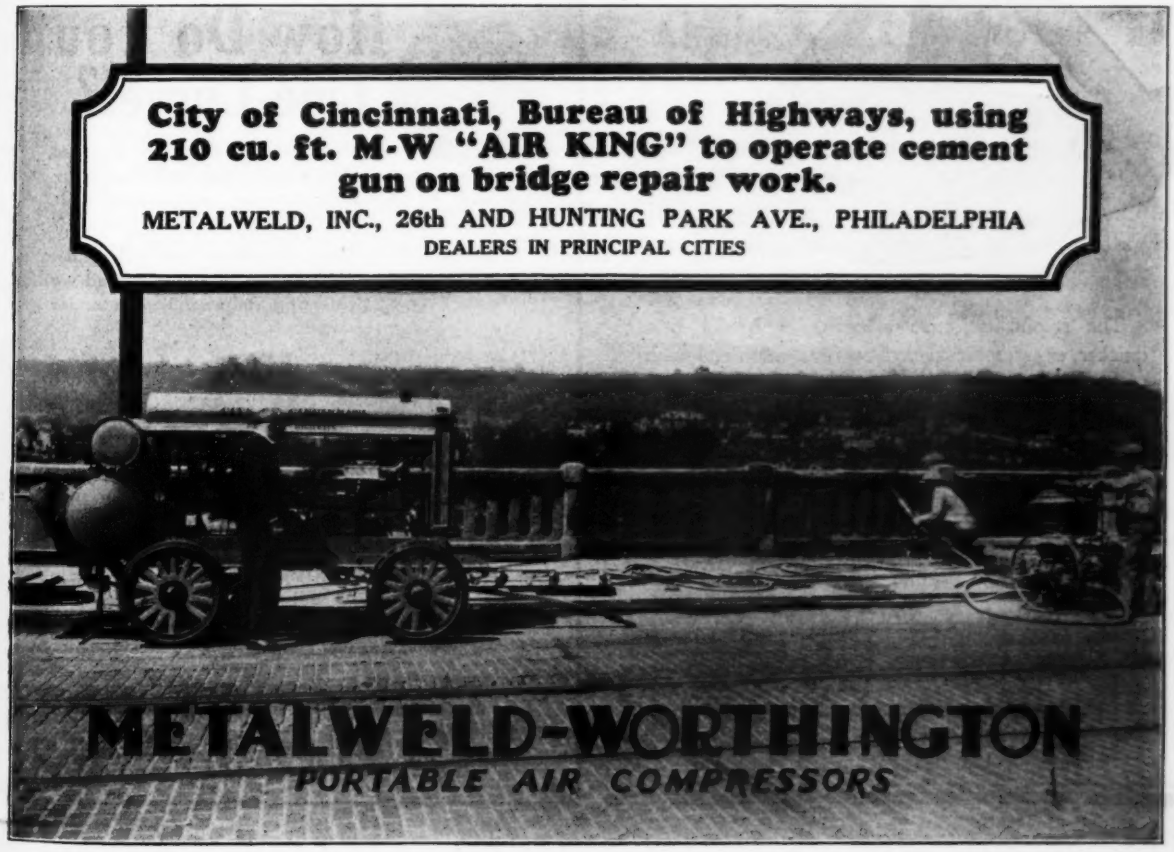
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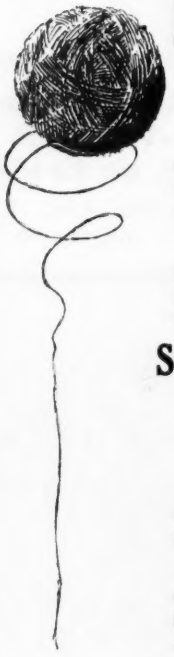
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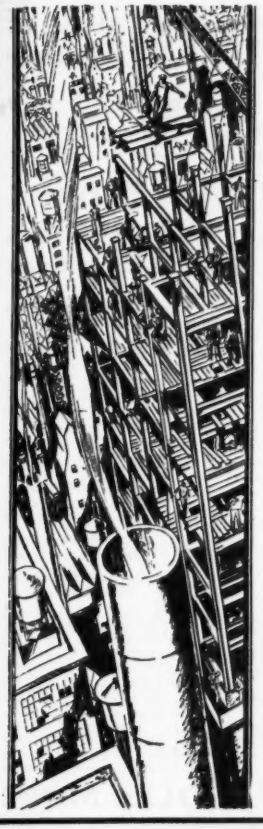
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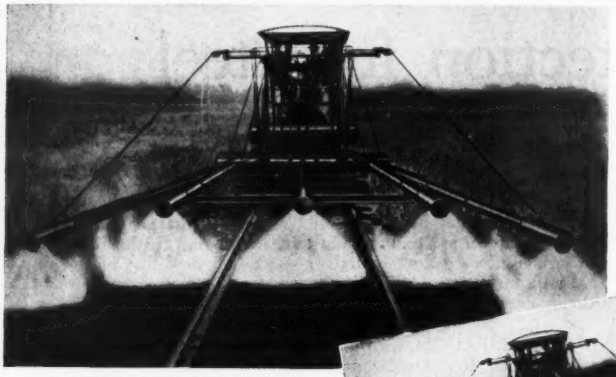
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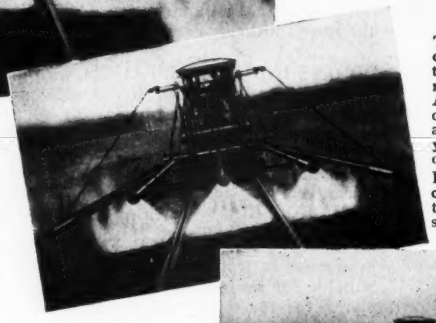
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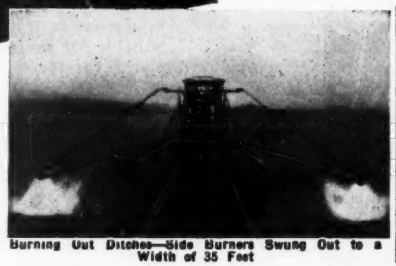
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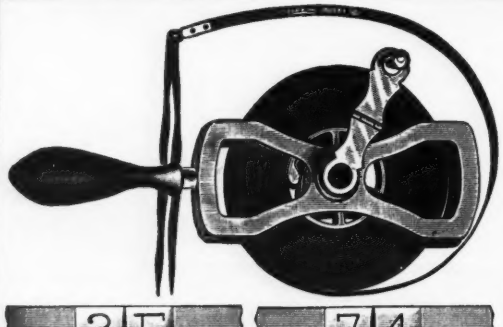
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Ingersoll-Rand Co.
Sullivan Machinery Co.

Airport Drainage
Armco Culvert Mfrs. Assn.

Aluminum Markers
Premax Products, Inc.

Anchors, Rail
See Rail Anchors

Anti-Creepers, Rail
Bethlehem Steel Co.
Lundie Engineering Co.
P. & M. Co.
Verona Tool Works
Woodings Forge & Tool Co.

Asphalt
Barber Asphalt Co.

Ballast Cleaners
Industrial Brownhoist Corp.

Ballast Screens
Maintenance Equipment Co.

Ballast Spreaders
Jordan Co., O. F.

Ballast Trimmers
Jordan Co., O. F.

Ballaster, Power
Maintenance Equipment Co.

Bank Builders
Jordan Co., O. F.

Bank Slopers
Jordan Co., O. F.

Band Saws
American Saw Mill Machinery Co.

Bars
Bethlehem Steel Co.
Carnegie Steel Co.
Illinois Steel Company

Bearings, Axle
Buda Co.
Fairbanks, Morse & Co.
Fairmont Railway Motors, Inc.
Kalamazoo Railway Supply Co.

Bearings, Roller
Timken Roller Bearing Co.

Bearings, Tapered Roller; Thrust and Journal Box
Timken Roller Bearing Co.

Benders, Rail
See Rail Benders

Blasting Powders
DuPont de Nemours & Co., Inc., E. I.

Blasting Supplies
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Bolts
Bethlehem Steel Co.
Illinois Steel Co.

Bonding Outfits, Rail
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Bonds, Signal
American Steel & Wire Co.

Braces, Track
Ramapo Ajax Corp.

Bridge Floors
Armco Culvert Mfrs. Assn.

Bridge Warnings
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Building Beams, Concrete
Federal Cement Tile Co.

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Barber Asphalt Co.

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Buda Co.
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Calcium Carbide
Oxweld Railroad Service Co.

Car Replacers
American Chain Co., Inc.

Car, Spreader
Jordan Co., O. F.

Car Stop, Friction
Maintenance Equipment Co.

Cars, Ballast
See Ballast Cars

Cars, Dump
See Dump Cars

Cars, Hand
Buda Co.
Fairbanks, Morse & Co.
Fairmont Rv. Motors, Inc.
Kalamazoo Ry. Supply Co.

Cars, Industrial
Magor Car Corp.

Cars, Inspection
Buda Co.
Fairbanks, Morse & Co.
Fairmont Railway Motors, Inc.
Kalamazoo Railway Supply Co.
Woolery Machine Co.

Cars, Motor
Buda Co.
Fairbanks, Morse & Co.
Fairmont Ry. Motors, Inc.
Kalamazoo Ry. Supply Co.
Woolery Machine Co.

Cars, Section
Buda Co.
Fairbanks, Morse & Co.
Fairmont Railway Motors, Inc.
Kalamazoo Railway Supply
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Cars, Velocipede
Buda Co.
Fairbanks, Morse & Co.
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Kalamazoo Railway Supply Co.

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Barber Asphalt Co.
Carey Co., Philip

Cement Roofing Tile
Federal Cement Tile Co.

Chemical Weed Killer
Chipman Chemical Engineering Co., Inc.

Clamshell Buckets
See Buckets, Clamshell

Clips, Adjustable
Ramapo Ajax Corp.

Coal Handling Machinery
Industrial Brownhoist Corp.
Northwest Engineering Co.

Coaling Stations
Fairbanks, Morse & Co.
Chicago Bridge & Iron Works

Compressors
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.
Sullivan Machinery Co.

Compromise Joints
See Joints, Compromise

Concrete Roofing Tile
Federal Cement Tile Co.

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Federal Cement Tile Co.

Condensers
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Northwest Engineering Co.

Creosoted Timber
See Timber, Creosoted

Cribbing, Concrete
Federal Cement Tile Co.

Crossing Gates
Buda Co.
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Crossings, Highway
Barber Asphalt Co.
Carey Co., Philip

Crossings, Rail
Buda Co.
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wharton Jr. & Co., Wm.

Culvert Pipe
Armco Culvert Mfrs. Assn.
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Armco Culvert Mfrs. Assn.
Toncan Culvert Mfrs. Assn.

Culverts, Paved Invert
Armco Culvert Mfrs. Assn.

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Southern Cypress Mfrs. Assn.

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Wharton Jr. & Co., Wm.

Derailing Switches
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Disinfectants
Chipman Chemical Engineering Co., Inc.

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Buckeye Traction Ditcher Co.
Harnischfeger Corp.
Jordan Co., O. F.
Northwest Engineering Co.

Doors
Richards-Wilcox Mfg. Co.

Draglines
Northwest Engineering Co.

Drainage Gates
Armco Culvert Mfrs. Assn.

Drains, Perforated
Armco Culvert Mfrs. Assn.
Toncan Culvert Mfrs. Assn.

Drills, Earth
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Drills, Pneumatic
Chicago Pneumatic Tool Co.
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Drills, Rock
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Ingersoll-Rand Co.
Sullivan Machinery Co.
Verona Tool Works

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Sullivan Machinery Co.

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Kalamazoo Railway Supply Co.

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See Cranes

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Excavators
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Northwest Engineering Co.

Explosives
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American Steel & Wire Co.
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American Steel & Wire Co.
Anchor Post Fence Co.
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American Steel & Wire Co.
Anchor Post Fence Co.
Page Fence Association

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Graver Corp.

Flange Lubricators
Maintenance Equipment Co.

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Forgings
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Frogs
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Buda Co.
Ramapo Ajax Corp.
Wharton Jr. & Co., Inc., Wm.

Gages, Measuring
Lufkin Rule Co.

Gages, Pressure Gas
Oxweld Railroad Service Co.

Fumigants
Calcyanide Co.

Gas, Acetylene
Oxweld Railroad Service Co.

Gates, Drainage
Armco Culvert Mfrs. Assn.
Toncan Culvert Mfrs. Assn.

Generators, Acetylene-Carbic
Oxweld Railroad Service Co.

Graphite
Dixon Crucible Co., Joa.
U. S. Graphite Co.

Graphite Paint. See Paint, Graphite

Grease, Track
U. S. Graphite Co.

Grinders, Portable
Buda Co.
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

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American Chain Co., Inc.
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Ingersoll-Rand Co.
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Sullivan Machinery Co.

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Chicago Pneumatic Tool Co.
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Sullivan Machinery Co.

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Timken Roller Bearing Co.

Hangers, Door
Richards-Wilcox Mfg. Co.

Head Drains, Perforated
Toncan Culvert Mfrs. Assn.

Heaters, Feed Water
Graver Corp.

Heel Blocks
Bethlehem Steel Co.

Highway Crossings
See Crossings, Highway

Hoisting Machinery
Fairbanks, Morse & Co.
Industrial Brownhoist Corp.
Ingersoll-Rand Co.

Hoists, Air Motor
Chicago Pneumatic Tool Co.
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Hose
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

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Barber Asphalt Co.

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Jordan Co., O. F.

Insecticides
Calcyanide Co.

Inspection Cars
See Cars, Inspection

Inspection, Engineering
Hunt Co., Robert W.

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Rail Joint Co.

Insulating Material
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Jacks, Bridge
Buda Co.
Kalamazoo Railway Supply Co.

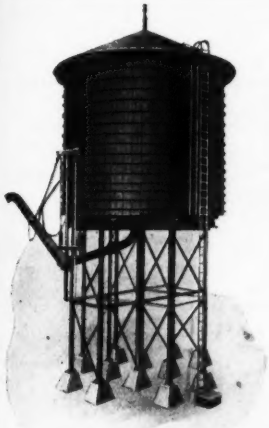
Jacks, Track
Buda Co.
Kalamazoo Railway Supply Co.
Verona Tool Works

Joints, Compromise
American Chain Co., Inc.
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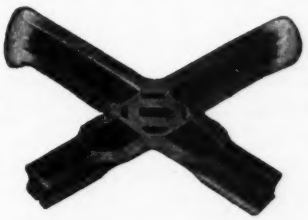
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See Cars, Motor

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See Engines, Oil

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Dixon Crucible Co., Jos.
National Lead Co.
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Central Foundry Co.
U. S. Cast Iron Pipe & Foundry Co.

Pipe, Corrugated
Armco Culvert Mfrs. Assn.

Pipe Joint Compound
Dixon Crucible Co., Jos.

Pipe, Sewer
Armco Culvert Mfrs. Assn.
Central Foundry Co.

Pipe, Wood
Pacific Tank & Pipe Co.

Plants, Water Treating
Chicago Bridge & Iron Works.

Plates, Miscellaneous
Ramapo Ajax Corp.

Poles
Jennison-Wright Co.
National Lumber & Creosoting Co.
Prettyman & Sons, J. F.

Posts, Bumping
See Bumping Posts

Posts, Fence
See Fence Posts

Post Hole Diggers
Buda Co.

Powders
DuPont de Nemours & Co., Inc., E. I.

Power Plants, Portable
Syntron Co.

Preformed Track Pavement
Carey Co., Philip

Preservation, Timber
Jennison-Wright Co.
National Lumber & Creosoting Co.
Prettyman & Sons, J. F.

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Oxweld Railroad Service Co.

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Fairbanks, Morse & Co.
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Sullivan Machinery Co.
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Buda Co.
Fairbanks, Morse & Co.
Fairmont Railway Motors Inc.
Kalamazoo Railway Supply Co.

Push Car Bearings
Timken Roller Bearing Co.

Rail Anchors
Bethlehem Steel Co.
Lundie Engineering Corp.
P. & M. Co.
Verona Tool Works
Woodings Forge & Tool Co.

Rail Anti-Creepers
See Anti-Creepers, Rail

Rail Benders
American Chain Co., Inc.
Buda Co.
Verona Tool Works

Rail Bonds
Verona Tool Works

Rail Braces
Bethlehem Steel Co.
Buda Co.
Ramapo Ajax Corp.
Wharton Jr., & Co., Wm.

Rail Expanders
Ramapo Ajax Corp.

Rail Filler
Carey Co., Philip

Rail Joints
See Joints, Rail

Rail Layers
Buckeye Traction Ditcher Co.
Maintenance Equipment Co.
Nordberg Mfg. Co.

Rail Saws, Portable
Industrial Brownhoist Corp.
Kalamazoo Railway Supply Co.

Rail Springs
Verona Tool Works

Rails, Girder
Bethlehem Steel Co.

Rails, Tee
Bethlehem Steel Co.
Carnegie Steel Co.

Regulators, Oxy-Acetylene
Oxweld Railroad Service Co.

Repairs, Flooring
Stonhard Co.

Replacers, Car & Locomotive
American Chain Co., Inc.
Buda Co.

Resurfacing Material
Stonhard Co.

Retaining Walls, Precast
Federal Cement Tile Co.

Rivets
Bethlehem Steel Co.

Rock Hammers
Ingersoll-Rand Company

Rods, Welding
Oxweld Railroad Service Co.

Roof Slabs
Federal Cement Tile Co.

Roofing, Cement & Concrete Tile
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Roofing Composition
Barber Asphalt Co.

Rules
Lufkin Rule Co.

Rust Preventive
Dearborn Chemical Co.

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Lufkin Rule Co.

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Scoops
Ames Shovel & Tool Co.

Screw Spikes
Illinois Steel Company

Screw Spike Drivers
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Section Cars
See Cars, Section

Sharpeners, Rock Drill Steel
Ingersoll-Rand Co.

Sheathing Paper
Barber Asphalt Co.

Sheet Iron
Armco Culvert Mfrs. Assn.

Shingles, Composition
Barber Asphalt Co.

Shovels
Ames Shovel & Tool Co.
Verona Tool Works
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Shovels, Steam
Harnischfeger Corp.
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Signals, Bridge & Warning
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Snow Melting Device
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Snow Plows
Jordan Co., O. F.

Spades
Ames Shovel & Tool Co.

Spikes
Bethlehem Steel Co.
Illinois Steel Co.

Spreader Cars
See Cars, Spreader

Spreaders, Ballast
See Ballast Spreaders

Standpipes
Chicago Bridge & Iron Works.
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Stands, Switch & Target
Bethlehem Steel Co.
Ramapo Ajax Corp.

Steel, Alloy
Central Alloy Steel Corp.
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Steel, Electric Furnace
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Bethlehem Steel Co.
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Steel, Special Analysis
Timken Roller Bearing Co.

Step Joints
See Joints, Step

Storage Tanks
Chicago Bridge & Iron Works.
Graver Corp.
Pacific Tank & Pipe Co.

Storm Sewers, Corrugated Iron
Armco Culvert Mfrs. Assn.

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Buda Co.
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Tampers, Tie
See Tie Tampers

Tanks & Fixtures
Fairbanks, Morse & Co.

Tanks, Fire Protection
Chicago Bridge & Iron Works

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Tanks, Roadside Delivery
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Pacific Tank & Pipe Co.

Tanks, Steel
Chicago Bridge & Iron Works
Graver Corp.

Tanks, Wood
Pacific Tank & Pipe Co.

Tapes, Measuring
Lufkin Rule Co.

Tee Rails
See Rails, Tee.

Telegraph Poles
See Poles

Telltales
Hastings Signal & Equipment Co.

Testing of Materials
Hunt Co., Robert W.

Thawing Outfits
Lundie Engineering Corp.

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Jennison-Wright Co.
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Prettyman & Sons, J. F.

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Federal Cement Tile Co.

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Southern Cypress Mfrs. Assn.

Timber, Creosoted
Jennison-Wright Co.
National Lumber & Creosoting Co.
Prettyman & Sons, J. F.

Tools, Drainage
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Oxweld Railroad Service Co.

Tools, Pneumatic
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Tools, Track
Ames Shovel & Tool Co.
Buda Co.
Maintenance Equipment Co.
Verona Tool Works
Woodings Forge & Tool Co.

Torque Switches
Bethlehem Steel Co.
Buda Co.
Ramapo Ajax Corp.
Wharton Jr. Co., Wm.

Torches, Oxy & Acetylene Cutting & Welding
Oxweld Railroad Service Co.

Track Braces
See Braces, Track

Track Cranes
Buckeye Traction Ditcher Co.
Nordberg Mfg. Co.

Track Drills
See Drills, Track

Track Gages
Buda Co.
Kalamazoo Railway Supply Co.

Track Jacks
See Jacks, Track

Track Levels
Kalamazoo Railway Supply Co.

Track Liners
See Liners, Track

Track, Special Work
Ramapo Ajax Corp.
Wharton, Jr., & Co., Wm.

Track Tools
See Tools, Track

Trucks, Hand, Steel
Anchor Post Fence Co.

Tubing, Seamless Steel
Timken Roller Bearing Co.

Tunnel Warnings
Hastings Signal & Equipment Co.

Undercrossings, Corrugated Iron
Armco Culvert Mfrs. Assn.

Warning Devices, Bridge & Tunnel
Hastings Signal & Equipment Co.

Water Columns
Fairbanks, Morse & Co.

Water Cranes
Fairbanks, Morse & Co.

Water Tanks
Chicago Bridge & Iron Works.
Graver Corp.
Pacific Tank & Pipe Co.

Water Treating Plants
Dearborn Chemical Co.

Water Treating Tanks
Chicago Bridge & Iron Works.
Graver Corp.

Waterproofing Fabrics
Barber Asphalt Co.

Waterproofing Asphalt
Carey Co., Philip

Weed Burner
Fairmont Railway Motors, Inc.
Woolery Machine Co.

Weed Killer
Chipman Chemical Engineering Co., Inc.

Welding & Cutting Equipment
Oxweld Railroad Service Co.

Welding, Oxy-Acetylene
Oxweld Railroad Service Co.

Well Casings
Armco Culvert Mfrs. Assn.

Wheels, Hand & Motor Car
Buda Co.
Fairbanks, Morse & Co.
Fairmont Railway Motors, Inc.
Kalamazoo Railway Supply Co.
Woolery Machine Co.

Wheels, Wrought Steel
Carnegie Steel Co.

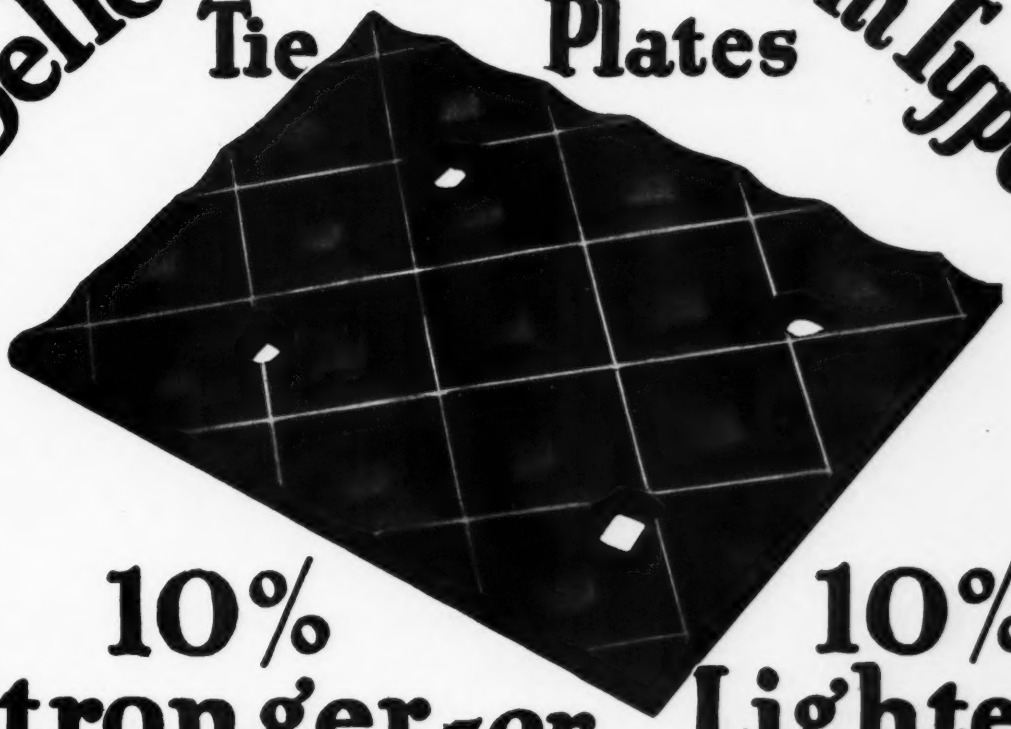
Windshields
Fairbanks, Morse & Co.
Fairmont Railway Motors, Inc.

Wire Fencing
American Steel & Wire Co.
Anchor Post Fence Co.
Page Fence Association

Wood Preservation
See Preservation, Timber

Wood Working Machinery
American Saw Mill Machinery Co.

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10% Stronger -or 10% Lighter

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ALPHABETICAL INDEX TO ADVERTISERS

A

American Chain Co., Inc. 52
American Saw Mill Machinery Co. 59
American Steel & Wire Co. 17
Ames Shovel & Tool Co. 22
Anchor Post Fence Co. 15
Armco Culvert Mfrs. Ass'n. 11

B

Barber Asphalt Co. 61
Bethlehem Steel Co. 45
Buckeye Traction Ditcher Co. 27
Buda Co. 53

C

Calcyanide Co. 56
Carey Co., Philip 32
Carnegie Steel Co. 35
Central Alloy Steel Corp. 16
Central Foundry Co. 58
Chicago Bridge & Iron Works 28
Chicago Pneumatic Tool Co. 37
Chipman Chemical Engineering Co., Inc. 49

D

Dearborn Chemical Co. 55
Dixon Crucible Co., Jos. 57
DuPont de Nemours & Co., Inc., E. I. 18

E

Eclipse Air Brush Co. 52

F

Fairbanks, Morse & Co. 19-20
Fairmont Railway Motors, Inc. 4-5
Federal Cement Tile Co. 46

G

Graver Corp. 25

H

Harnischfeger Corp. 9
Hastings Signal & Equipment Co. 59
Hunt Co., R. W. 61

I

Illinois Steel Co. 6
Industrial Brownhoist Corp. 39
Ingersoll-Rand Co. 24

J

Jennison-Wright Co. 26
Jordan Co., O. F. 34

K

Kalamazoo Railway Supply Co. 10

L

Lufkin Rule Co. 58
Lundie Engineering Corp. 3

M

Magor Car Corp. 53
Maintenance Equipment Co. 1
Mechanical Mfg. Co. 56
Metalweld, Inc. 55

N

National Lead Co. 13
National Lock Washer Co. 65
National Lumber & Creosoting Co. 59
Nordberg Mfg. Co. 12-43
Northwest Engineering Co. 7

O

Oxweld Railroad Service Co. 38

P

P. & M. Co. 41
Pacific Tank & Pipe Co. 61
Page Fence Ass'n. 29-30
Premax Products, Inc. 54
Prettyman & Sons, J. F. 66

R

Rail Joint Co. 23
Ramapo Ajax Corp. 48
Reliance Mfg. Co. 2
Richards-Wilcox Mfg. Co. 40

S

Sellers Mfg. Co. 63
Simmons-Boardman Publishing Co. 50-51-56
Southern Cypress Mfrs. Ass'n. 21
Stonhard Co. 42
Sullivan Machinery Co. 59
Syntron Co. 31

T

Timken Roller Bearing Co. 33

U

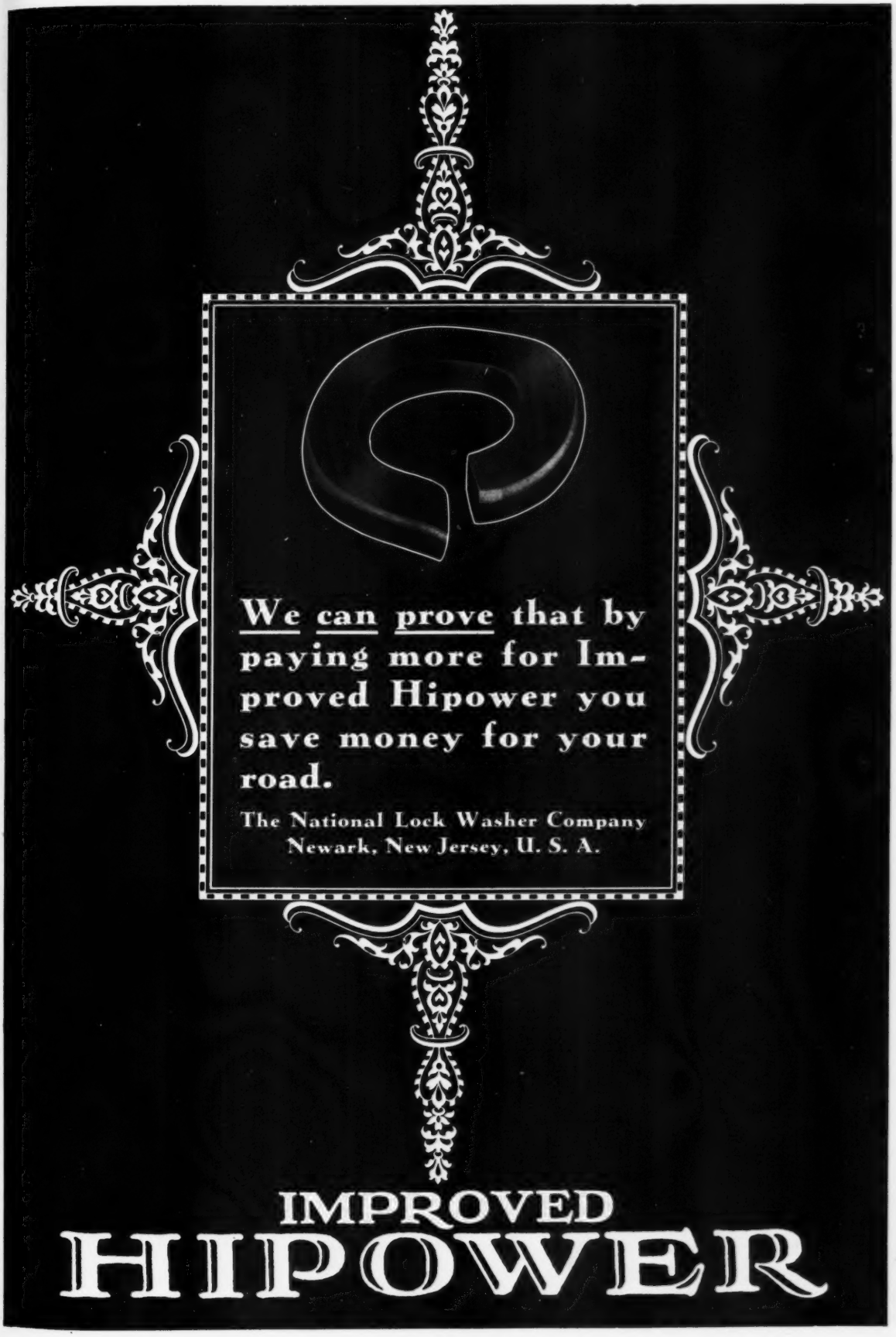
U. S. Pipe & Foundry Co. 36
U. S. Graphite Co. 57
United Iron Works, Inc. 54

V

Verona Tool Works 8

W

Wharton, Jr., & Co., Wm. 61
Woodings Forge & Tool Co. 14
Woolery Machine Co. 38


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Brilliant Sunshine and Spanking Sea Breezes Season these Ties

KINDLY climatological conditions favor quick, thorough air seasoning of the cross ties which the complete and modern creosoting plant of J. F. Prettyman & Sons transforms into Prettyman Preserved Ties.

Averages for the 58 years of existence of the U. S. Weather Bureau at Charleston, S. C., based on noon readings, compare as follows with grand averages (over the years of existence of the U. S. Weather Bureau at each) for 16 representative points east of the Mississippi, at or near which are located important wood preserving plants:

	Temperature (Degrees F.)	Wind Velocity (M.P.H.)	Possible Sunshine (%)	Relative Humidity (%)
Charleston	66.1	10.30	65	64
Grand Average for 16 Points	62.3	9.33	95	64.86

As each of these factors is most favorable to proper air seasoning in its maximum degree, the advantages of Charleston's climate are forcefully illustrated by the table above.

And on the Prettyman seasoning yards, Nature's gentle but thorough process is assisted by man. Note in photo the careful stacking of ties in triangular form to permit free circulation of air about each and quick shedding of rain water. Note high, dry and thoroughly drained yard. Note creosoted skids under each stack.

Thorough air seasoning of ties prevents injury by insects and decay before preservation . . . increases durability in service . . . prevents shrinking and checking in service . . . increases strength . . . decreases weight and shipping charges . . . makes possible deeper and more uniform penetration of the preservative.

That is why seasoning is regarded as such an important factor in the production of Prettyman Preserved Ties. Write for prices and complete data.

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Wood Preserving Plant
Charleston, S. C.